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ON OUR COVER — This WEEDS TREES & TURF interpretation of a greenback illustrates our emphasis this month on the business side of the Green Industry.

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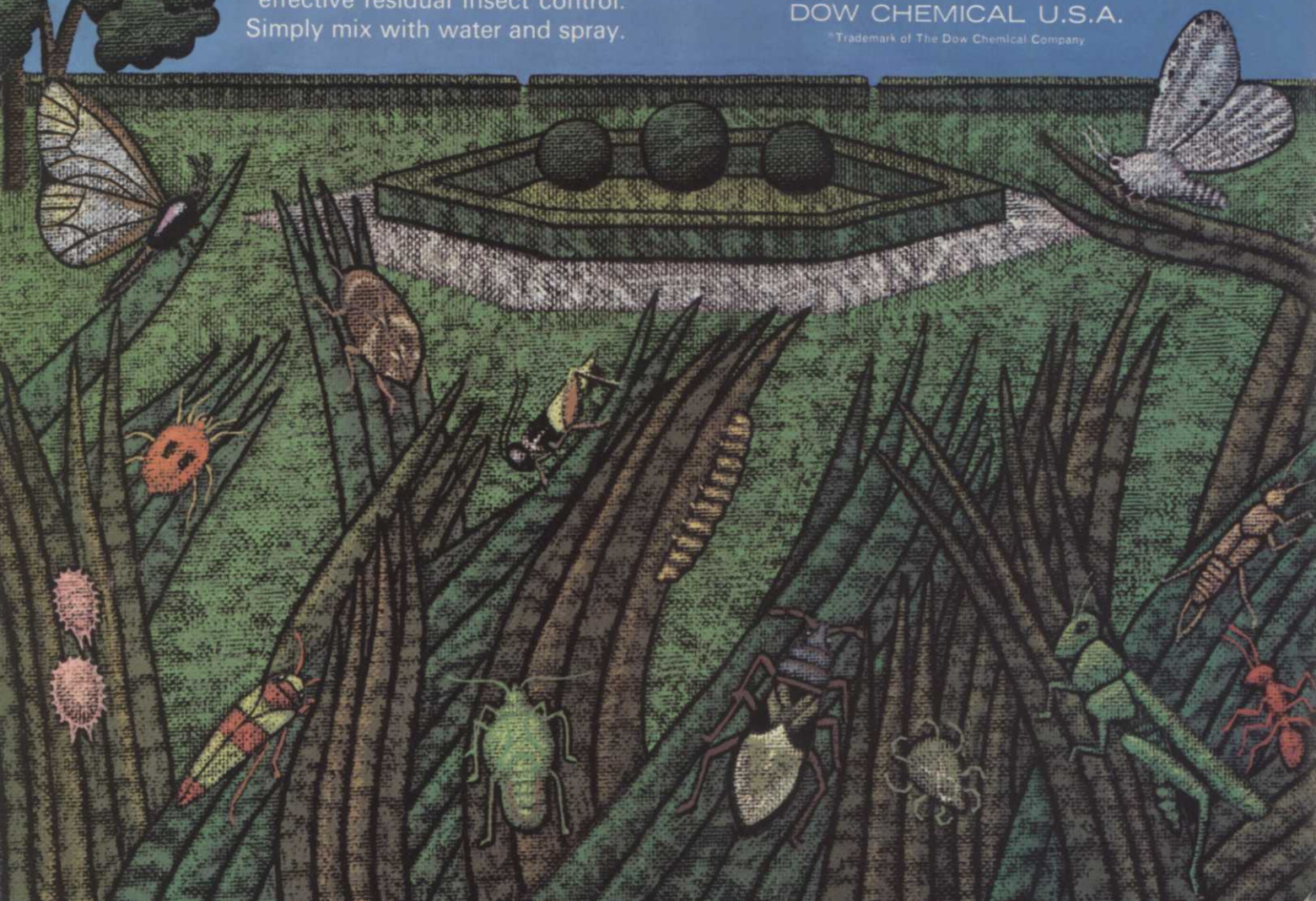

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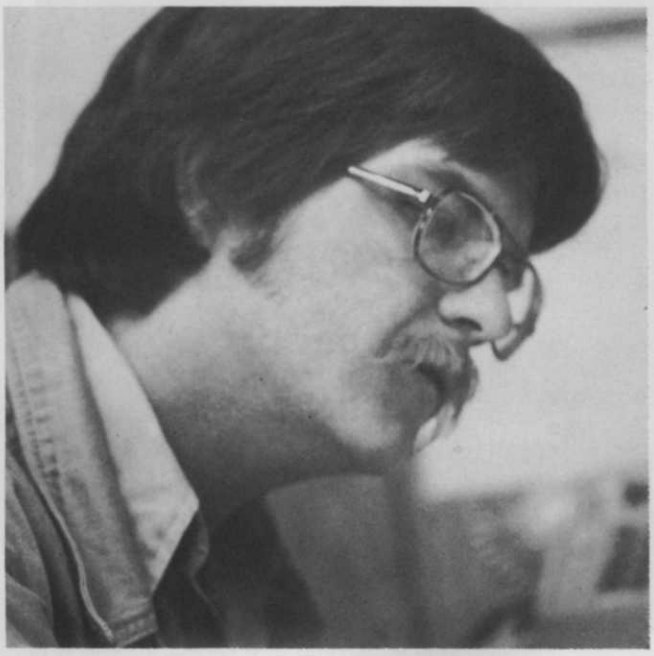

Morris- "quality management is essential"

This month I am most pleased to announce the appointment of Ron Morris as assistant editor for WEEDS TREES & TURF. Ron comes to us from Purdue where he was graduated with a B.S. in agronomy. He has a strong background in turfgrass management and communications, a tailor-made background for his new position.

Bred in a small Indiana town, Ron is "a countryboy at heart" with a great affinity for the outdoors. When he says, "People who do not regard the environment with the highest regard are little better than criminals," he means it. Ron also believes in quality management for cultivated green areas. "With new houses going up in what used to be pasture areas, it's a necessity," he emphasizes, "Besides, plants are a lot prettier than cement."

Living with the realities of business is our thrust this month. No matter how knowledgeable we may be about the technical aspects of our jobs, if we aren't sound business managers, we are far less than adequate and may even endanger our organizations.

On page 16 you'll find the results of a study by the University of Pittsburgh Bureau of Business Research on ten of the most common management traps that lead to business failure. Don't miss it. Another important facet of business management is understanding taxes, the new Tax Reform Act made several changes that can affect you. Be sure to read John Arkin's plain talk about what these changes mean to you, page 20.

Contributing writer Harold Le Sieur prepared an in-depth article on effluent water, see page 12, exclusively for WEEDS TREES & TURF. This experimental irrigation method is already in use in parts of drought-stricken California, and for the rest of the West and Southwest it's just a matter of time before waste water is the norm for irrigating turfgrass.

For coping with large-scale jobs, see how Florida's sound management program for aquatic weed control has lead to cleaner lakes and waterways which, in turn, means great economic gains for the state, page 28. On page 38 you'll learn how a half million dollars and much work and effort turned Portland International Airport into the "greenest in the country."

There is still time to send in your suggestions and material for our new publication, LAWN CARE INDUSTRY, to be launched later this month. We are all deeply involved with this new publication, as well as WEEDS TREES & TURF, and continue to appreciate two-way communication with our readers.

Gail D. Hogan

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Government News

EPA has begun an inquiry into a possible cancer hazard associated with pronamide, a weed and grass killing pesticide used on lettuce, alfalfa, berries and fine turf, such as golf courses. The Agency is also seeking information on economic and other benefits from the herbicide. The inquiry is known as a "rebuttable presumption against registration." It was initiated because a 1974 study by the Medical College of Virginia in Richmond shows that pronamide caused liver tumors in mice.

EPA has published a 72-page report on the "Susceptibility of Woody Plants to Sulfur Dioxide and Photochemical Oxidants." The report, prepared by Dr. Donald D. Davis of the Center for Air Environmental Studies at Pennsylvania State University, is a detailed review of United States and European literature. For your free copy, write to the Office of Public Affairs, Corvallis Environmental Research Laboratory, 200 S.W. 35th St., Corvallis, OR 97330.

OSHA is considering development of generic standards for classes of chemicals, it was disclosed by Gilbert J. Salter at the Joint Conference of the American Chemical Society and the Chemical Institute of Canada held in Montreal recently. The class standard approach was opposed at the meeting by Dow Chemical's Dr. Etcyl Blair. Blair said he was opposed because of the "peculiarities specific to every single molecule." As an example, he said, vinyl chloride and DDT are both chlorinated hydrocarbons, but that they differ widely in their ability to concentrate in water, as opposed to fatty substances. Blair said he favors a listing of priority items for the establishment of standards.

The delegation of authority in a majority of pesticide misuse cases to the EPA regional offices is expected to take place soon. Delegation of the duties now performed by the Pesticide Misuse Review Committee has been delayed because the headquarters office wanted to wait until the fate of the proposed amendments of Section 12(a)(2)(G) was decided. Since the decision to give FIFRA a simple extension and hold oversight hearings later this summer delayed any changes in the use provision for some months, PTSED is thinking of going ahead with the plan for the regions to handle misuse along with the other civil and criminal sanctions.

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Industry News

Project Pest Alert effected in 16 ports

Plant pests invading the US will be less likely to become established because of a new early warning system to find them promptly, according to the USDA.

The warning system, called "Project Pest Alert," establishes a 100-mile detection belt around 16 major ports of entry that stand a high risk of offering a foothold to foreign plant pests. USDA animal and plant health inspectors will systematically survey about 1,000 locations in each detection belt.

USDA plans to expand the project to 39 locations within three years.

Syracuse Research gets EPA contract

The EPA has awarded a contract to Syracuse Research Corp. for the study of chemical methods for the degradation/detoxification of pesticides.

The study includes a state-of-the-art evaluation on the chemical reactions which are capable of degrading forty pesticides and assessment of the environmental hazards of the various degradation products.

The information collected will be used to prepare a manual which describes the practical methods for the disposal of waste pesticides and pesticidal solutions. The manual is intended for pesticide users with limited technical knowledge in pest control.

Scotts develops new winter blends

A Scotts research team headed by turf agronomist Eugene Mayer has developed two winter overseeding blends, according to Dick Stahl, ProTurf director.

The first blend, Winter Turf I, is approximately a 40-30-20-10 combination of Manhattan perennial ryegrass, Loretta perennial ryegrass, Pennfine perennial ryegrass and Victa Kentucky bluegrass. It can be mowed as low as three-sixteenths of an inch.

Winter Turf II is an all ryegrass blend featuring two improved varieties, including approximately 40 percent Derby Perennial ryegrass, 30 percent Loretta perennial ryegrass and 30 percent Linn perennial ryegrass.

Univ. of Minn. field rebuilt

The University of Minnesota Memorial Stadium (Minneapolis) has just undergone a complete rebuilding of their football field. Originally 11,000 square yards of artificial turf was replaced at a cost of $600,000, according to Glenn Rehbein, ASPA Board member.

The artificial turf and the blacktop and rock under it, are being replaced by sprinklers and drain tile, along with topsoil and grass. The artificial turf has been used for only about five years.

TAES recommends slow-release N

Recent research by the Texas Agricultural Experiment Station indicates that a sizable fraction of the nitrogen applied to golf greens as conventional fertilizer may be lost, and may additionally constitute a stream pollution hazard.

The use of slow-release and organic forms of fertilizer including sewage sludge eliminated the loss problem, thus providing both economic and environmental benefits.

150 attend service training school

The turf-care industry's first known regional factory service training network attracted 140 students in the 1976 academic year, Daniel L. Hedglin, Cushman-Ryan service manager, has announced.

The curriculum includes 2½-day classes conducted on a rotating basis at regional schools in Atlanta, San Francisco, and Lincoln, Neb. Classes are structured to permit specialized training by mechanics in the turf care industry.

Hedglin said Cushman-Ryan hopes to expand the regional school system this fall by adding facilities in Fairfield, N.J. and Seattle.

Edmonton gets AAN GSC designation

The American Association of Nurserymen has announced the official designation of Edmonton, Alberta, Canada, as a Green Survival City. The city had been previously recognized as a Green Survival City by the Canadian Nursery Trades Association.

The official AAN designation now brings the total Green Survival Cities to eleven. Other cities so recognized include Raleigh, N.C.; Athens, Ga.; Burlingame, Calif.; Maryville, Tenn.; Anderson, Ind.; and Corvallis, Ore. Counties honored with Green Survival designations include Shelby County, Tenn., and San Diego County, Calif.

Fungus may help regenerate oaks

A shot of a special kind of fungus may regenerate young oak seedlings which have a tendency to just "sit there".

Gene Cox and Gene Garrett, University of Missouri-Columbia forestry researchers, are inoculating soil surrounding seedling roots with a mycorrhizal fungus to produce a symbiotic relationship between the fungus and the tree root. The researchers believe the fungus will help the roots by improving their uptake of water and nutrients. In return, the tree root will provide food for the fungus.

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LEAF SPOT on bentgrass (melting-out stage).

LARGE BROWN PATCH (Rhizoctonia solani).

TYPHULA BLIGHT or Gray Snow Mold, close-up view.

RUST (Puccinia graminis) on bluegrass.

FUSARIUM BLIGHT (Fusarium roseum and Fusarium tricinctum).

PYTHIUM BLIGHT or Cottony Blight (Pythium spp.).

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Effluent water— New hope for greener turf

by Harold LeSieur

In drought-stricken California, a method to save water by irrigating golf courses less expensively has to attract attention. The worst drought in California's history has forced attention on a relatively obscure method of water conservation — the recycling and reuse of sewage effluents. Now everybody stands to win as a result: a safe method of waste disposal for sanitary engineers, a sound means for recharging dwindling ground water supplies for the conservationist and hydrologist, and a new source of less expensive water and fertilizer for the golf course superintendent.

Water shortages spur development

Now in its second year, the longest dry spell in California's history is giving strong impetus to waste water reuse. A concentrated campaign is underway to conserve this scarce resource, now critically short from inadequate snowfall in the eastern Sierra Nevada watershed.

Yet the problem is more basic than two years of drought in this populous state, or prolonged dryness throughout the Far West. "We are constantly using more water than is going back into the ground table", observes Dr. Ian Pepper of the University of Arizona Turfgrass Research Center. He points to "enormous interest" by golf course superintendents from all over the country in the work of his institution. Research results will be made public within one year, showing how far beyond consumptive use levels irrigation with sewage effluent may safely be carried on turfgrass-soil systems.

Researchers at the University of Arizona check turfgrass plots installed in a lysimeter to determine the efficiency of turfgrass-soil systems in removing nitrogen under high effluent loads.

Primary and secondary sewage treatment (Figure 1) produce a disinfected, relatively clear effluent suitable for irrigation use. Tertiary, or advanced water treatment, is comparatively rare and limited generally to recovery of potable drinking water. Now, however, a form of tertiary treatment is seen to be possible using turfgrass-soil systems to "polish" sewage effluents while accepting irrigation water and fertilizer ingredients in the bargain. Until recently, this waste water effluent has been largely reserved for crop production, at irrigation levels only. Now, however, treatment by soil-turfgrass systems, to recharge underground water supplies at capacities far above simple irrigation needs, is the prize being sought.

Combining the promises of conserving a scarce natural resource, at a savings to potential users, with by-product fertilizer as an added bonus and in a manner promising to be non-polluting to the environment — this method has attracted attention for good reasons indeed.

In some cases this waste water is not merely attractive but a necessity. At Rossmore Leisure World, in Southern California's Laguna Hills, a local water company must supply irrigation water to huge Irvine Ranch, to famed "Lion Country" and to the Laguna Hills golf course as well. No outflow to the Pacific Ocean is permitted, so that all waste water must either be utilized or evaporated.

It was not until 1974 that the American Water Works Association, guardian of high quality standards in public drinking water, went on record urging waterworks officials to plan reuse of wastewater. Acknowledging that "pristine waters are rare, and diminishing," AWWA past president Henry Graeser observes that "It is only a matter of time until all water utilities will have to consider the question of waste water reclamation and reuse, at least to some degree." To this Graeser adds, "In the southwestern and western U.S. it is not a matter of time. These areas are living with the problems."

One of the most promising reuse methods, from a cost-effectiveness standpoint, tertiary treatment of golf course turfgrass has a champion in Dr. Victor B. Younger of University of California, Riverside. His summary points to the basic need for this technology: "Water is a valuable resource, particularly in the West. This will continue to be true from here on out."

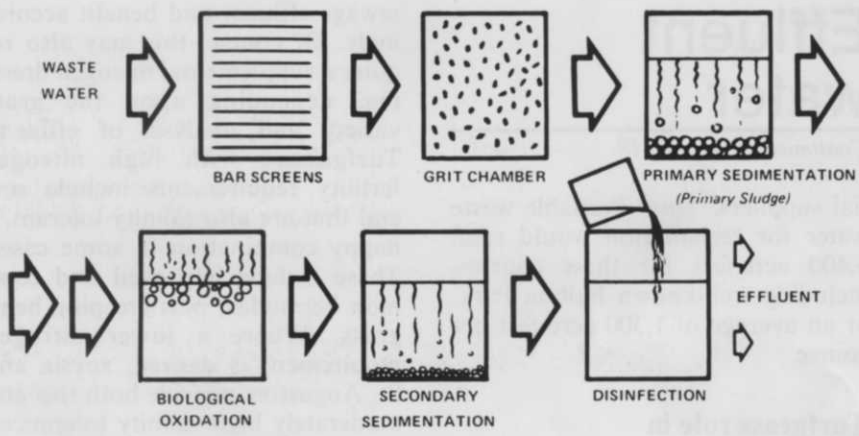

Figure 1 — *Flow diagram of primary and secondary sewage treatment.*

California mecca for reclamation

California is prolific in providing examples of existing and planned uses of sewage effluent for golf course irrigation. Arizona and Michigan also boast several courses using this technique, as do some other eastern states.

One of the earliest in California to treat its turfgrass in this fashion is the Corona National golf course, near Riverside, since the early 1950's. Corona's John Bell and Jim Noble are described as "veteran users", by Professor Younger of U.C. Riverside. In the "early days" of their project, Corona's staff consulted with Younger on an algae and chlorosis problem associated with sewage ponding.

A more publicized California recovery project, described as "one of the most successful demonstrations of the use of reclaimed water", is the Santee Country Water District near San Diego. Since the early 1960's, reclaimed sewage has been used to irrigate the Carlton Oaks golf course, plus a tree farm and even to provide a popular lake for recreational swimming.

Less publicized is the Marine Corps Air Station at Twenty Nine Palms, California, which has utilized reclaimed effluent for over 10 years. At Furnace Creek golf course in famed Death Valley and at Whittier Narrows recreation area, both in Southern California, this economic method of irrigating is practiced.

As many examples again can be mentioned. According to Mike Yamada, a sanitary engineer with the Los Angeles City Bureau of Sanitation, the City of San Clemente has been doing this since 1957. Ventura City, he says, has 10 years experience in waste water use, and the La Cañada Country Club (near Glendale) can point to over 8 years actual trial of the technique. In his list, Yamada also includes the Moulten Niguel and Rossmore Leisure World courses, both in the Laguna Hills, plus the San Joaquin course in the huge Irvine Ranch.

Two courses in Hollywood's rambling Griffith Park are presently in the feasibility study stage, with estimated installation of waste water irrigation within a possible 6 months. Griffith Park will receive reclaimed water from the City of Los Angeles' Glendale plant.

According to the California State Department of Water Resources, San Diego courses are a good bet, with 5 different water treatment plants serving as poten-

Continued on page 14

Effluent water

Continued from page 13

tial suppliers. Total available waste water for reclamation would total 6,400 acre-feet for these courses, including well-known Balboa Park, or an average of 1,300 acre-feet per course.

Turfgrass role in "polishing" sewage

All types of plants are not equally well suited to irrigation with reclaimed sewage effluent. Fortunately, turfgrasses are among the best in this respect. They take up large amounts of the nitrogen, phosphorus and potash found in such waters. Generally, they can also be exposed to large amounts of boron without showing toxicity symptoms. However, all turfgrasses are not the same, and some are better than others. Salinity tolerance, for example, is highest for improved and common bermudas, creeping bentgrass, zoysia, St. Augustine and tall fescue.

Ornamentals, on the other hand, have a low tolerance to both salinity and boron. If such plants are to be used, a separate irrigation system using better water is recommended by Professor Younger.

In order for turfgrass-soil systems to function efficiently in waste water "polishing", they must perform a number of functions. In addition to taking up soluble fertilizer ingredients — nitrogen, phosphorus and potash — they must maintain satisfactory infiltration rates while effectively screening sedimentts. An equally important quality of turfgrass-soil systems has been demonstrated recently; namely, denitrification by microorganisms and bacteria. Thus, any nitrogen which is not utilized directly in feeding turf may be further eliminated by bacteria in the carbon content of grass debris and roots.

Naturally, a turfgrass variety with high nitrogen fertility requirement will remove most effectively this fertilizer ingredient from a given sewage effluent and benefit accordingly. Of course, this may also require a supplemental nitrogen dressing, depending upon the grass variety and analysis of effluent. Turfgrasses with high nitrogen fertility requirements include several that are also salinity tolerant, a happy combination in some cases. These include improved and common bermudas, plus creeping bentgrass. Where a lower nitrogen requirement is desired, zoysia and St. Augustine provide both this and moderately high salinity tolerance.

To illustrate the nitrogen uptake possible, bermudagrass is reported to require 8 to 16 pounds per 1,000 square feet during a 12-month growing season. Annual ryegrass needs approximately one pound of nitrogen per 1,000 square feet per month during the winter season. These grass species, which are common to the Southwest, have a high nutrient demand and may be used effectively year-round for sewage effluent purification.

Potential users of renovated water for golf course irrigation can feel added confidence from the reassurance of Professor Younger. "If a golf course has available sewage effluent water," "it should strongly consider using it for irrigation. From 95 percent to 99 percent of all domestic effluents which have undergone secondary treatment are satisfactory for this purpose." To this he adds, "We have been researching this for years, and don't need more research. We know the method can be used effectively." Of course, Younger is the first to recommend a preliminary test of soil and effluent water source, before selecting proper irrigation rates and deciding upon a suitable maintenance program.

Does this literally mean that further research on this problem is unneeded? Not at all. Even Younger would like to see more data on variations in effluent waters and on salt tolerances of various turfgrasses and ornamentals. However, the technique of using turfgrass-soil systems for tertiary treatment of sewage effluents is a matter of agricultural engineering application — no longer one of basic research. Even so, work underway at several universities does show promise of broadening knowledge in this socially-valuable field.

One of the more significant programs underway in the U.S. is that of the Turfgrass Research Center at the University of Arizona. As early as 1972, R. C. Sidle and G. V. Johnson of the University's Soils, Water and Engineering Department demonstrated that turfgrass can be irrigated with sewage effluent at rates in excess of plant water requirements and 95 percent purification efficiency, yet without hazard of ground water pollution from nitrogen.

Currently, a team comprising Professors William R. Kneebone, Ian Pepper (a soil biochemist from Great Britain) and the same Gordon Johnson is being funded by the State of Arizona. Specific objectives of this study effort, using turfgrass plots installed in a lysimeter is to determine the efficiency of turfgrass-soil systems in removing nitrogen under high effluent loads. Also, to determine which turfgrass species and cultivars are most efficient in filtering effluent and utilizing nitrogen. Treatments up to four times consumptive use will be evaluated. At the moment, Arizona's researchers are trying common bermuda, overseeded with rye grass during winter, and will monitor this over an entire year to determine variations between seasons.

The use of sewage effluent for irrigation has been well documented for production of food and fiber crops, and this work has served as a valuable back-drop to golf course application of this methodology. Researchers at Pennsylvania State University, University of Pennsylvania, Michigan State and the University of Arizona have demonstrated feasibility of utilizing sewage effluents for irrigating forage and small grain crops, or the safety of simple disposal in forest lands. A joint project at Michigan State University is currently demonstrating use of waste water to grow grass for cattle feeding.

At University of California, Los Angeles, Dr. Wade Berry is reported investigating the use of waste water for irrigation of both vegetables and ornamentals.

Of course, the six years of work

Continued on page 45

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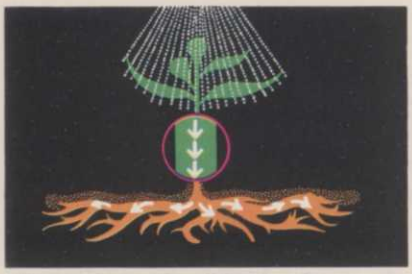

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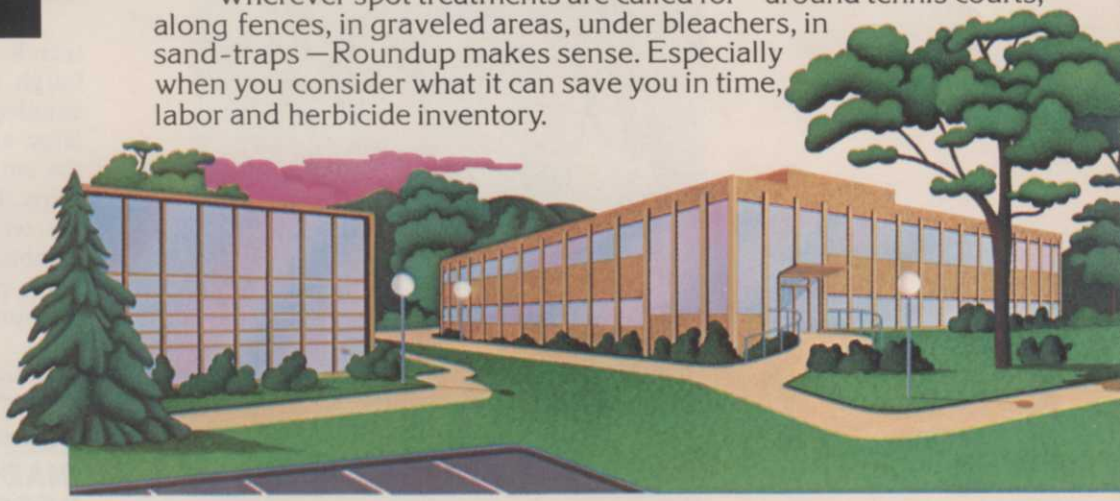
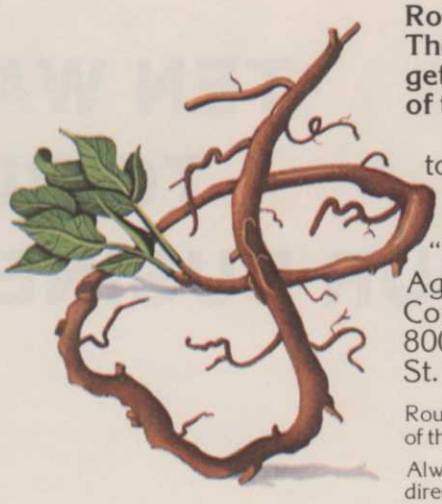
Once, many different herbicides and frequent repeat treatments were needed. Now, one man with a hand sprayer can handle most weed cleanup chores with one treatment of Roundup.

Wherever spot treatments are called for—around tennis courts, along fences, in graveled areas, under bleachers, in sand-traps—Roundup makes sense. Especially when you consider what it can save you in time, labor and herbicide inventory.



Roundup destroys many of your toughest weed problems.
Including bermudagrass, bluegrass, quackgrass, bindweed, Canada thistle, johnsongrass, fescue, and vaseygrass.



Roundup. The herbicide that gets to the root of the problem.
To put Roundup to work for you, consult your herbicide dealer or write: "Roots," Monsanto Agricultural Products Company, C3NF, 800 N. Lindbergh Blvd., St. Louis, Missouri 63166.

Roundup® is a registered trademark of the Monsanto Company.

Always read and follow the label directions for Roundup herbicide.
RINST 6/7

Roundup is well-suited to sensitive areas.
Roundup won't wash, leach or volatize to injure adjoining desirable vegetation. Normal precautions should be observed to avoid spray drift.

Monsanto

Circle 119 on free information card

TEN WAYS TO RUIN YOUR BUSINESS

Whether you own your own Green Industry business or are responsible for the non-crop vegetation management for a private or public organization, how well you manage can determine its success or failure.

The Bureau of Business Research of the University of Pittsburgh recently conducted a highly detailed survey of why businesses large and small fail. Following are the ten most common management traps. Being guilty of failing one of the ten major ones outlined, or a combination of several, can sink your profitable organization into oblivion.

KEEPING INADEQUATE RECORDS

The surest way to run afoul of accountants and tax collectors is to conduct your business with "scraps of paper." A drawer full of bills, a stack of receipts and notations on the backs of envelopes detailing orders is not sufficient.

Poor records lead to an absence of adequate information to allow you to judge the results of your operation. Inadequate record keeping was the greatest single cause of business failures unearthed. It was a major factor in nine out of every ten businesses studied. Managers did not know they were heading for trouble until it was too late.

IGNORE NEW DEVELOPMENTS IN YOUR FIELD

Doing things the same old way simply because they were once successful is a sure way to invite aggressive, up-to-date competition to take over. The report emphasized that "keeping abreast" was not only essential to growth, but

detailed a number of instances where failure to adopt new ways was a dominant factor in leading to the "out-of business" signs. One important method of keeping abreast of new developments is to read your business publications such as WEEDS TREES & TURF.

INCUR CUMULATIVE LOSSES 3

A trickle of red ink isn't much to worry about, or is it? At least 40% of the businesses studied discovered that the "little" leaks added up to a torrent. Add one unproductive crew to excessive waste in some other area: couple it to "minor" losses elsewhere, and the result can wreck havoc with your profit and loss statement.

HITCH YOUR WAGON TO ONE CUSTOMER 4

Signing a single big customer to the exclusion of others may look like an easy road to a secure future. Sod growers and tree farmers who concentrate on one large customer and lawn care companies that contract for one development will have no place to hide when the customer suddenly sours. The University of Pittsburgh report shows that three out of every ten bankrupt firms fell into this particular inviting trap.

BE YOUR OWN EXPERT 5

Trying to save money on professional advice can lead to costly mistakes, the survey shows. Experts usually do cost money, but specialized opinions minimize errors: for a sound basis for decisions.

Also consider the valuable assistance that can be provided by your County Extension Agent.

Operate solely on your own hunches and half-proven guesses and you could wind up making one or two that could literally destroy your turfgrass or shrubbery.

BUILD A FAMILY EMPIRE 6

Nepotism may be one way to keep your family in control, but beware. Unless your relative is at least as competent in his job as someone else you might hire, the practice of burdening a payroll with family members siphons cash from the till and squelches initiative in non-family employees.

It isn't only a question of the cash drain going out to a non-productive or lazy relative. Think what happens to other members of your team when conscientious, eager management talent finds the top of the ladder blocked.

FORGET ABOUT COST ANALYSIS 7

So long as the checkbook shows a balance, why bother? For one thing, the investigators proved that unless you know exactly what it costs to provide your service or produce your product, the matter of pricing is largely guesswork. Usually it boils down to "meeting the competition." But competition can only go so far in setting a price.

If you cannot provide your product or service at a profitable price, it is probably better, the experts agree, to drop it and let the competition go bust. If the competition can handle the product or service profitably, then something is wrong with your costs. Only careful cost analysis can pinpoint the faults.

Continued on page 18

Ten mistakes *Continued from page 17*

IGNORE YOUR COMPETITOR'S MISTAKES

Many business magazines detail glowing success stories. Meet a fellow manager or superintendent at a convention, and he is likely to tell you about the things he's doing right. But what about the ones that fall by the wayside. If they are in your Green Industry, it is a good idea to find out what happened.

The answers may be more revealing than studying — or worst yet, envying the success around you. One important method of keeping up is to take a look at the many agronomy and business courses offered at your local universities.

Take a look at the agronomy courses offered at your local university.

EXPAND BEYOND RESOURCES

An enthusiastic employee who signs up dozens of big orders can throw your business schedule into a tailspin if you aren't geared to increase your output. Likewise, a prosperous business gulping down smaller businesses whenever the opportunity occurs, can result in more problems with coordination than were dreamed of when the business was a single unit.

Again, if your business expands, or your responsibilities do, before you have a solid base for the old ones, you have expanded beyond your resources.

A really successful business, the study shows, grows within its means. The rate can be fast or slow, but it must have sound financial footing and, above all, the management talent necessary to consolidate new gains.

Also under this heading are such expansion moves as runaway borrowing to purchase little needed equipment. The report states quite frankly that some lenders lack "proper management and financial analysis" and that credit to some thinly capitalized companies in the study was surprisingly easy.

LET EVERYONE SHIFT FOR HIMSELF

The researchers cite several instances where partners were so busy trying to outsmart each other that otherwise profitable businesses were jeopardized by the intramural struggles. Uneven work loads on supervisory personnel, failure to delegate authority along with responsibility, unusual or unequal management privileges inevitably sap a management team of its enthusiasm.

Coordination comes from the top and the objectives and energies of your business must come from the same direction.

Failure to provide firm guidance along these lines results in either staff or crew bickering or a company figuratively set adrift. In either case, the management breakdown can prove disasterous.

There are other points in the Bureau of Business Research study: Failure to watch depreciation schedules on equipment, neglecting to provide for a competent successor to the present management, and a host of specialized reasons why particular businesses went bust. But the ten points listed here are applicable to any business, large or small.

Whether or not you are next on the red ink parade depends, in large measure, upon how well you follow or how well you avoid this checklist of ten common management traps. □

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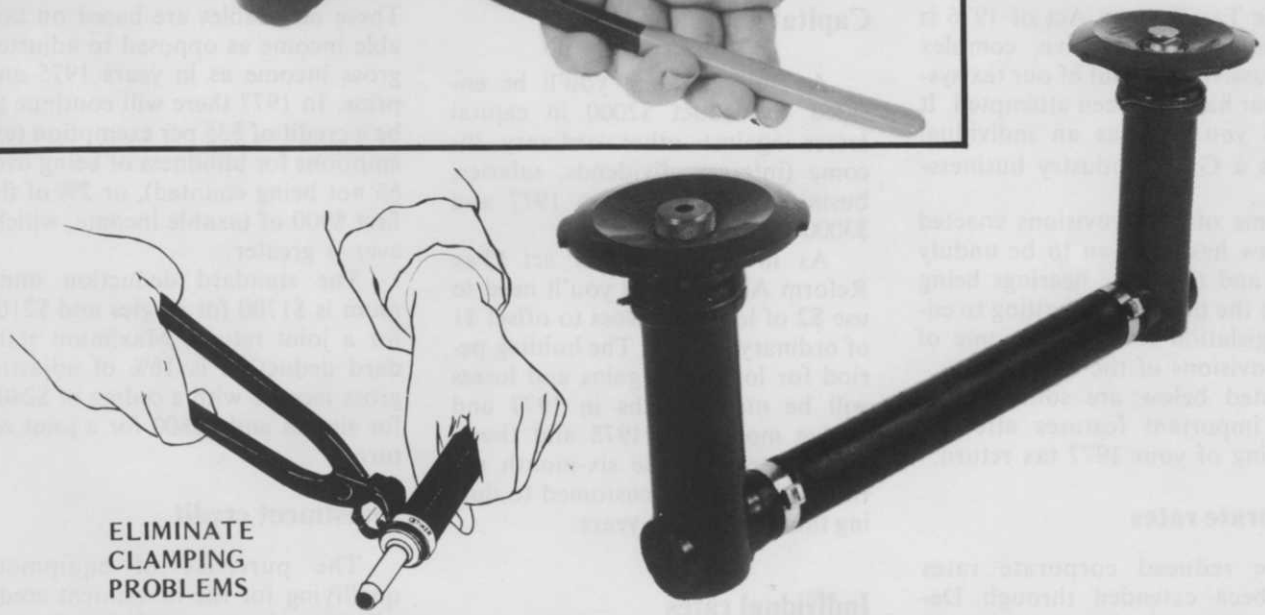

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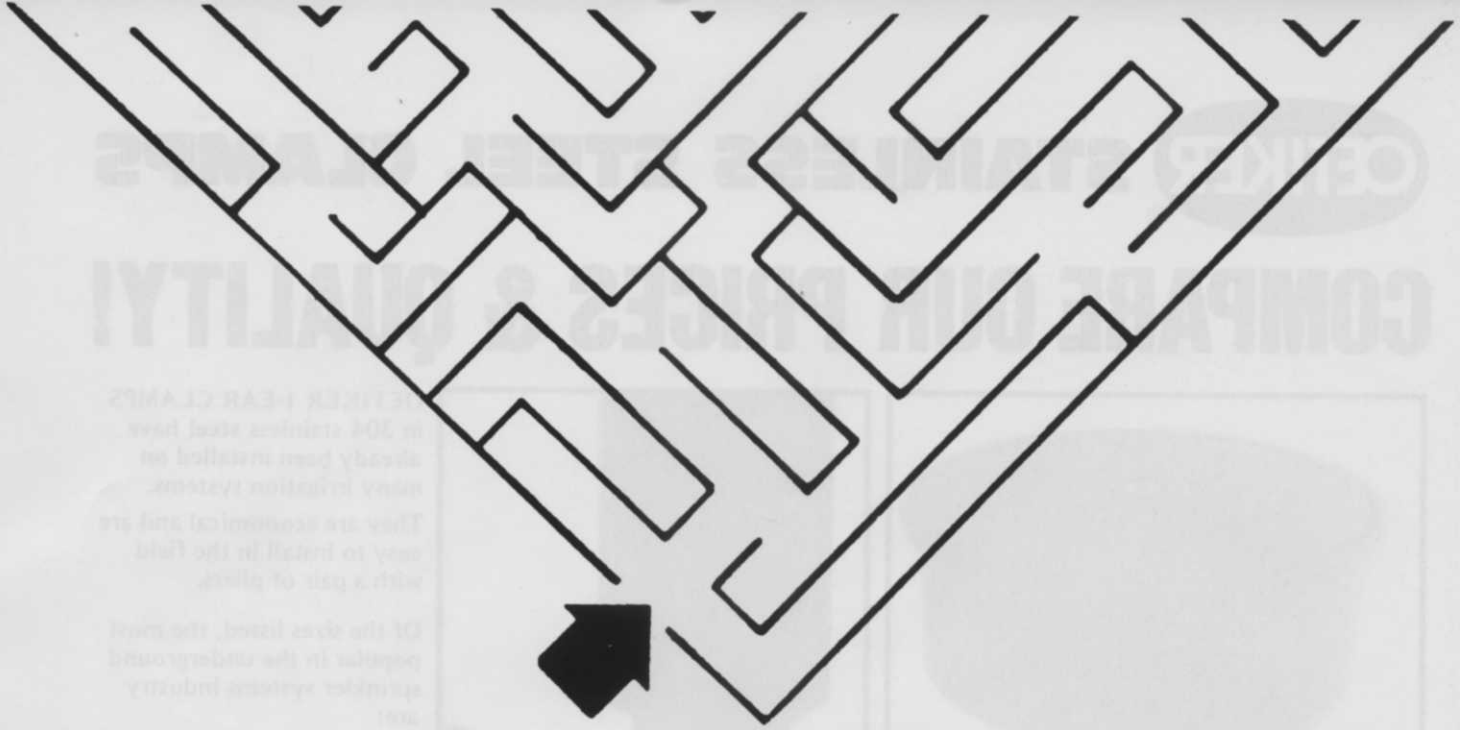

Living in 1977 with the Tax Reform Act of 1976

by Joseph Arkin CPA, MBA

The Tax Reform Act of 1976 is the most comprehensive, complex and massive overhaul of our tax system that has ever been attempted. It affects you both as an individual and as a Green Industry businessman.

Some of the provisions enacted into law have proven to be unduly harsh and there are hearings being held at the time of this writing to enact legislation to mitigate some of the provisions of the 1976 Act.

Listed below are some of the more important features affecting the filing of your 1977 tax return:

Corporate rates

The reduced corporate rates have been extended through December 31, 1977. Corporations will pay 20% on the first $25,000 of taxable income, 22% on the next $25,000 and 48% on taxable income in excess of $50,000.

Capital gains and losses

As an individual you'll be entitled to deduct $2000 in capital losses against other ordinary income (interest, dividends, salaries, business profits, etc.) in 1977 and $3000 in 1978.

As in the prior tax act (Tax Reform Act of 1969) you'll need to use $2 of long-term loss to offset $1 of ordinary income. The holding period for long-term gains and losses will be nine months in 1977 and twelve months in 1978 and thereafter instead of the six-month period we've been accustomed to during these many past years.

Individual rates

There hasn't been any change in the tax rates but all taxpayers having a taxable income of $20,000 or less must use a new set of tax tables. These new tables are based on taxable income as opposed to adjusted gross income as in years 1975 and prior. In 1977 there will continue to be a credit of $35 per exemption (exemptions for blindness or being over 65 not being counted), or 2% of the first $900 of taxable income, whichever is greater.

The standard deduction minimum is $1700 for singles and $2100 for a joint return. Maximum standard deduction is 16% of adjusted gross income with a ceiling of $2400 for singles and $2800 for a joint return.

Investment credit

The purchase of equipment qualifying for the investment credit will give rise to a 10% credit as a reduction against tax liability — this applies both to individuals and corporations.

Continued on page 22

Maintaining an effective turf-care program often becomes a contest between you, nature and the budget. And professional turf-care managers know the value of having top quality, precision-built equipment in their line-up.

That's why we build Ryan turf equipment with performance, dependability, and economy. Because, after all, good turf-care isn't a game. It's a profession.

For more information write for your free catalog today.

1 **Greensaire II:*** Second generation of the Ryan coring aerator. Removes cores on 2" centers down to 3" depth.

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3 **Spikeaire:*** Disc spiker for aeration.

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6 **Turf Minute-Miser:*** Personnel transportation and towing ball pickers, Greensweep, utility trailer.

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11 **Pro-Edge:*** Professional edger.

12 **Rollaire:*** All-purpose roller.

13 **Sod Cutters:*** Self-propelled heavy-duty and junior models.

14 **Lawnaire:*** Home lawn aerator.

*Self-powered and/or propelled.

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The turf-care line-up.

Tax reform Act

Continued from page 20

And until December 31, 1980 the ceiling on investments in used property will remain at $100,000.

Corporations with ESOPS (employee stock option plans) can get an extra 1% if they meet certain requirements — and the credit can go as high as 11½% if both employer and employees agree and contribute the extra ½% to the plan.

Foreign conventions

To halt the abuse of conventions being held outside the U.S. (to make them more sightseeing than business and a drain on the balance of payments) the law now provides that you can only deduct for the costs of attending two foreign conventions in any year. If more than two are attended, the option is left to the taxpayer to claim deductions for the two of his choice. There are also limits to the amounts that can be spent for transportation and subsistence.

The per diem limit for subsistence expense for any one day can't exceed the per diem rate applying to U.S. civil servants serving in that area of the world during the calendar month in which the convention begins.

Transportation expenses are limited to coach or economy fares only, no first class fares. The transportation costs will not be allowed in full if half or more of the total days of the trip are spent on non-business related activities.

It would be prudent to attend at least two-thirds of the business activities (seminars, converences, lectures, etc.) scheduled during the convention. Make sure you sign in and keep a detailed log or diary and proof of attendance. In fact you're going to need a statement from the sponsoring organization verifying the amount of time you spent at business-related activities and functions.

Qualified stock options

Both as an employee and stockholder-employee the new law spells bad news. Stock options granted under plans adopted after May 20, 1976 give rise to immediate tax liability as *ordinary* income.

Plans adopted prior to May 20, 1976 qualifying under Sections 423 and 424 will still qualify. Restricted options must be exercised by May 21, 1981 to retain special treatment.

Child care expenses

This section is mislabled as the law also applies to persons (other than children under 15) who are physically disabled.

Does your spouse help in your business and you incur expenses to take care of your children or a disabled dependent?

The child care deduction has been abolished and a new non-refundable credit equal to 20% of the employment related expenses is available. This reduces your tax liability, not just your taxable income and is a decided advantage.

There are a lot if "ifs and buts" — payments to relatives now qualify if the person isn't your dependent and you pay social security taxes on the wages paid; (b) if your spouse works part time the earned income limit applies to the spouse with the lower income; (c) if the spouse has no earned income there is an assumed income of $166 per month if you have one dependent and $333 per month if you have two or more dependents; (d) marrieds can only claim the credit if a joint return is filed; (e) allowable expenses no longer need be reduced by the dependent's disability income.

It would be prudent to attend at least two-thirds of the business activities scheduled during the convention.

The new credits are $2000 for one individual (child under 15 or spouse or dependent incapable of self-care) giving rise to a cash credit of $400 or $4000 for 2 or more with an $800 credit.

Another important change here is that this actual reduction of tax liability can be taken and the standard deduction can still be used.

Sick-pay exclusion

The old sick-pay rules are thrown out and only a group of under 65-year-old disability retirees are eligible for the new disability exclusion.

According to many tax practitioners and publishers of tax periodicals there is a transition rule to protect those who qualified by retiring before January 1, 1976. ALSO, there is a little-known Public Law 94-455 which seemingly conflicts with the instructions on form 2440 and the instructions in current IRS tax booklets issued to the public.

Home office expenses

A taxpayer, employed or self-employed, must show that the deduction for a home office expense meets the stringent set of rules: (a) the area used must be exclusively used on a regular basis (cannot be part of a den or another room used for person pursuits) as a principal place of business, or as a place for meeting patients, clients, or customers in the normal course of business; (b) employees have to prove that the exclusive use is for the convenience of the employer. If you operate a business (retail or wholesale (out of your home as a selling operation and regularly use it for storage, you can still get a home-office deduction. Also, if you have a separate structure, not attached to your home, used exclusively for your business operation you can still get the deduction.

Keogh plans

The provision that you were able to contribute up to $750 without regard to percentage limit came into conflict with the rule limiting deductions to 25% of income. The new law removes the ceilings of 25% for

Continued on page 24

Healthy little beauty likes shade!

What a beauty little Glade Kentucky bluegrass has turned out to be! A fine, healthy specimen, Glade has a higher level of resistance to powdery mildew, and performs better than many other Kentucky bluegrasses in up to 60% shade as well as open sun. Glade, a Rutgers selection (nationally tested as P-29), has improved resistance to stripe smut and leaf rust. Midwestern and Northeastern university tests indicate that Glade has better than average resistance to Fusarium blight.

Glade is one of the fastest germinating bluegrasses, quickly forming a thick rhizome and root system. A dense, low-growing, leafy turf, Glade has an attractive medium to dark green color.

Glade Kentucky bluegrass is your guarantee of physically pure and genetically true seed. You won't be seeding annual bluegrass *(Poa annua)*, short-awned foxtail or bentgrass when you plant Glade. Specify this healthy little beauty in your next lawn seed mix. It blends beautifully with fine fescues and other elite bluegrasses, persists in shade when many others weaken. Glade Kentucky bluegrass is available at your local wholesale seed distributor. Insist on Glade in your mix.

Another fine, quality-controlled product of Jacklin Seed Company.

Glade

KENTUCKY BLUEGRASS

U.S. Plant Patent 3151

Tax Reform Act

Continued from page 22

self-employed taxpayers earning less than $15,000.

The ceiling on yearly contributions is still $7500 and limits of 15% of that contribution still apply.

Moving expenses

The 50-mile rule has been reduced to 25 miles, and the maximum deduction for pre-move house hunting and temporary living expenses has been increased from $1000 to $1500 while the maximum deduction for qualified expenses relating to sale, purchase and lease of a new principal residence has been increased from $2500 to $3000.

Non-business guarantees

Starting in 1976 the differences between guarantees and direct loans will end. If an individual taxpayer has a loss arising from a loan guaranty, he or she will get the same treatment as if the loss were from a direct loan. So, a loss on a guaranty connected with the taxpayer's trade or business will be treated as an ordinary loss. While a loss on a guaranty that's entered into for profit, but not connected with taxpayer's trade or business, will be treated as a short-term capital loss.

Prepaid interest

Cash basis taxpayers as well as accrual basis taxpayers will now have to spread the prepaid interest cost of a loan over the life of the loan. Points, other than those paid on home mortgages, must likewise be spread over the life of the loan.

Interest limitations

Where interest is deducted for investment purposes a limit of $10,000 is imposed, plus the amount of th investment income. Long-term capital gains are no longer counted as net investment income. Where interest in incurred in making an investment in a 50 percent owned corporation or partnership there is a special rule. Here the figure goes up to the lesser of $15,000 or the amount of the interest on the debt used to acquire the corporation or partnership.

Confusion abounds. All taxpayers are subject now to pre-'70, pre-'76 and post-'75 interest deduction rules. A special allocation rule applies to determine how much current investment interest is deductible on investments subject to the prior year rules. And, there are carry-over rules for currently disallowable interest to be carried forward indefinitely, subject only to the post-'75 limitations.

First-year depreciation

Under the old law $2000 limit ($4000 on joint return) of additional first year depreciation allowance applied to the partnership level. Thus five married partners could deduct $4000 each if the partnership purchased an asset for $100,000. Now the law makes the limit apply both at the partnership and partner level, so in effect the partnership will only be able to flow through to its partners their allocable shares of the $2000 limit.

There are many liberalizations regarding firing and layoff, because of lack of business.

Organization fees of partnerships

Corporations have had to amortize their organization expenses over 60 months, and now partnerships can make the same election of amortizaiton and can no longer deduct fees in the first year of operation.

Subchapter S corporations

Under existing laws only 10 stockholders were permissible. Now after 5 years of existence a Subchapter S corporation can have up to 15 shareholders. There are also new rules about joint ownership of stock, transfers to estates and trusts.

Prior law required new stockholders to file consent for Subchapter S election or the election was lost. Now the new stockholders needn't file a consent and the status of Subchapter S will remain unless the new stockholder files an election to terminate.

IRA benefits to homemakers

An employee can now set aside retirement savings for the benefit of a spouse who doesn't work outside the home. A qualifying individual can contribute up to $1750 to a single IRA that has subaccount for the spouse. Or he or she can make contributions to his or her own account up to $875 and up to $875 to a separate account for the spouse. In either case the total deduction does have an overall limit of 15 percent of compensation.

WIN benefits

The old law providing that an employer hiring a qualified person (the hard-core unemployed) and following all of the required rules could claim a cash credit against taxes of $25,000 plus half of the employer's taxes above $25,000. Now the ceilings are raised for a credit up to $50,000 plus half the taxes above $50,000 — and there are many liberalizations regarding firing, and lay-offs, because of lack of business.

Joseph Arkin holds a BBA degree in accounting from St. John's University, an MBA degree in taxation from Pace University, is licensed by the States of New York and Florida as a Certified Public Accountant and is enrolled to practice before the Treasury Department.

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Arborists statistics for 1976

The National Arborist Association has compiled the following statistics from information submitted by its membership in 1976. The response rate was 37 percent. The material is presented here as a guideline for companies in related areas.

Small companies include those with a gross profit of less than $200,000; medium companies have a gross profit of between $200,000 and $500,000: large companies include those with a gross profit of over $500,000.

*Median is a statistical term meaning center. This tabulation method is helpful where extremes, either high or low, distort the data.

COMPENSATION

size of company	compensation rate per $100 payroll	wage increases from 1975	Total operating expenses
small companies	$8.35	10%	81%
medium companies	9.75	6%	86%
large companies	8.00	6%	90%

TRUCKS: TOTAL INDUSTRY

	Ford	Chev	Int	GMC	other
Make preference	69%	16%	6%	6%	3%
median age (yrs.)	6	6	6	6	6
median G.V.W. (T)	7	4	6	7	6
projected number owned by NAA members	3500	800	330	320	180

***MEDIAN EXPENSES**

median % volume paid to:	sales expense	administrative expense	direct expense	advertising	production labor	fringe benefits	parts & repair	depreciation	pesticides
small companies	1%	9%	60%	5%	30%	3%	6%	7%	4%
medium companies	13	11	62	1	33	5	6	4	3
large companies	4	10	76	1	39	5	5	4	2

***MEDIAN CUSTOMER CHARGES PER HOUR**

						Aerial Lift			Sprayer	
	Foremen	Climber	Groundmen	Crew Truck	Chipper	with box	without box	Stump cutter	with crew	without crew
small companies	$14.25	$13.50	$11.50	$6.00	$10.00	$15.00	$15.00	$17.50	$50.00	$15.00
medium companies	14.00	14.00	13.00	5.00	6.00	8.00	10.00	25.00	45.00	18.00
large companies	10.60	13.00	10.00	2.65	1.50	5.90	—	6.00	60.00	—

***MEDIAN WAGES**

	Trainees	Groundmen	Climbers	Tree Trimming Foremen	Utility Foremen	Spray Foremen	Landscape Foremen	Laborer, Landscape
small companies	$3.00	$3.30	$4.50	$5.25	$4.50	$4.75	$4.50	$3.50
medium companies	3.25	3.50	4.75	5.70	5.00	5.00	5.50	3.50
large companies	3.40	3.50	4.50	5.57	4.85	4.75	5.50	3.75

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Circle 121 on free information card

Florida's aquatic weed control— The key is maintenance

For boating, swimming or fishing, it's unlikely any Florida lake for its size achieves greater popularity than Winter Park's beautiful 223-acre Lake Virginia. Tourists, local residents, and particularly students from Rollins College, all enjoy its welcoming waters.

But this has not always been so. As recently as 1970, Lake Virginia and the other 13 lakes in that chain were clogged with vegetation. It was a situation which understandably hampered full enjoyment of the wide-ranging recreational opportunities.

Fortunately, city officials recognized the problem. By taking appropriate action, they now offer visible evidence that lakes can be reclaimed from weeds and again made valuable assets to a community.

Unwanted vegetation was brought under control, and a well organized maintenance schedule was initiated. Now, lakes superintendent Joe Frye and foreman Al Pieroni, together with a crew of seven, keep the lakes constantly inviting to those who love the water.

According to Frye, all lakes are checked regularly and chemically treated as needed, normally three times each year. "By keeping undesirable weeds constantly under control, we hold down overall costs. We use a fathometer to give us readings as to weed development. This approach has worked well for us.

"When we apply liquid herbicides such as Diquat and Endothall, we use the bottom acre foot method, injecting the materials directly down into the areas where the plants are rooted. Where it seems advisable, we use slow release pellets such as Hydout which drop

quickly to the bottom of the lake where they begin acting almost immediately on the plants we're after."

Small orange flags placed along the shoreline caution home owners and others that the lake waters are being treated with herbicides. The people know that when the flags are removed, the waters are again ready for use.

In the opinion of veteran aquatic weed scientist, Robert D. Blackburn, long associated with USDA's aquatic plant management program and now vice president of Joyce Environmental Consultants, Casselberry, Fla., the time has arrived for vigorous management of all our water resources.

"There is no question that water has become one of our most valuable assets. We can no longer take it for granted. As our population has grown, our water requirements have increased steadily. We have turned to the utilization of water resources no one even dreamed about using only a few years back."

Blackburn calls attention to the influence of water on the economics of a region. "Here in Florida, recreational aspects alone are of tremendous importance as a source of income for the state. It has great influence on land values. You'll find a lakeshore lot will cost three times as much as an otherwise identical lot just across the street. As a lakefront property owner you'll pay an extra 25 to 30 percent in taxes for this privilege. Tax assessors are well aware of the added value."

As Blackburn analyzes the situation, "We've traditionally ignored our water resources from the standpoint of invading aquatic weeds. We've landscaped our yards and added nutrients so we can grow beautiful lawns. At the same time, we've taken for granted that our backyard lakes will always remain beautiful for swimming or launching our boats. But those nutrients escaping with runoff water caused things to grow in our lakes the same as on land. Algae and higher aquatics have become a serious problem."

So what do we do?

Blackburn is offering a consulting and full scale management service. "We zero-in on selling a total management-type concept," he says.

Many of Blackburn's clients are the widely advertised Florida tourist attractions, most of which have aquatic weed problems. Others are drainage districts whose aim is to keep water flowing freely in their canals.

The goal in either situation is the elimination or control of unwanted aquatic weeds. Blackburn and others have developed systemized plans calling for regular water monitoring.

According to Blackburn, hydrilla has replaced water hyacinth as Florida's number one aquatic weed problem. Beginning with an obscure start in Florida about 1960, perhaps from an emptied family aquarium, hydrilla has become a national threat, spreading to Louisiana and Texas. "It's even been identified in Iowa," he says.

Hydrilla spreads easily and quickly via fragments floating

Continued on page 30

Inspection tour completed, Paul Kawaguchi carefully hauls his boat from the water. Regular inspection is a crucial part of good maintenance.

Aquatic weed control

Continued from page 29

downstream, or on boats carried from one body of water to another. Its nutrient needs are low, but it responds with rapid and luxuriant growth to runoff nutrients from fertilized lawns and fields.

What about control?

"We have three trains of thought here in Florida," Blackburn responds. "One group favors Diquat and copper. Another, copper and Endothall. The third approach calls for treatment with a pelletized product. With this pelletized material we are able to get the herbicide down to lake bottoms, treating the areas where the weeds are rooted."

Treating with pellets offers several other very definite advantages, he explains. "By releasing your toxic material at the lake bottom, you give the fish a chance to live. The chemical is released slowly, permitting fish to avoid toxic concentrations."

Before Blackburn and his staff treat a lake, they monitor it for at least 24 hours with portable oxygen meters, under both sunny and cloudy conditions. This gives them a basic idea as to the oxygen curve that can be expected when the lake is treated.

Blackburtn refers to his organization as "Nature's Guardian." "We're developing a broad program covering aquatic environmental management. It's like fitting together pieces of a jigsaw puzzle. Most of our equipment in the past has been borrowed from other uses. Now we're designing equipment distinctly for our needs to improve our efficiency. We're blending biological, chemical and mechanical control into a concept that should please everyone." Of course, to please everyone, weeds in some areas will be controlled to provide clear water, and left growing in others as cover for fish. "Except for our canals, none of us want completely clean bodies of water," Blackburn reminds. "Sure, a person with beach property wants open water near his home, but over on the backwoods side he wants all kinds of weeds to fish around. With a herbicide that stays where you put it, you can treat certain areas to have clear water, and leave weeds in an adjoining area untouched.

Paul Kawaguchi, of P.H.K. Inc. (Pollution Hazard Knockout, Inc.), is greatly involved with aquatic weed control in Central and South Florida. He also emphasizes maintenance programs with his customers. "A monthly inspection is a regular part of our service. By treating as needed, we put down less chemical at any one time. In the long run, it saves our customers money, and they have cleaner water all the time. It's like caring for a lawn. To remain attractive, it must be mowed from time to time."

Kawaguchi applies both liquids and pellets. Pellets give him the opportunity for more restrictive control over a specific area, he says. With an airboat spreading pellets over a 10-foot swath, he can treat an acre of water in approximately 20 minutes. "For applying liquid herbicides we drop hoses into the water to inject the chemical near the lake bottom where it will begin acting on the plants immediately. □

Kawaguchi uses both liquid herbicides and pelletized herbicides to keep lush aquatic weed growth under control.

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Chlorosis of red and silver maple

by Elton M. Smith and Cynthia D. Mitchell

Chlorosis or yellowing of foliage is a common symptom of a number of landscape trees due to one or a number of factors. In areas where the soil pH is above 6.5 manyu plants, including numerous Oak species, become deficient in iron as the iron is in a form unavailable to plants. The symptoms of iron deficiency are, typically, yellow foliage with green veins.

The symptoms of iron deficiency closely resemble the symptoms of manganese deficiency which occurs under the same high soil pH conditions. Manganese deficiency is common in Maples especially in Red (Table 2) and Silver in Ohio. In Michigan, manganese deficiency has also been observed in Sugar and Norway Maple (Table 1).

In advanced cases, the tissue between the veins turns brown particularly along the leaf margins. The symptoms are most likely to occur in the youngest or most recently developed foliage since manganese is relatively immobile within the foliage. New growth of Red Maple is likely to be stunted especially late spring or summer growth.

To properly diagnose chlorosis problems of trees and shrubs a soil test and leaf analysis are recommended. The soil test is important, in the case of manganese deficiency, to determine the soil pH while the leaf or tissue analysis accurately reveals the level of most major and minor mineral elements necessary for plant growth. The proper diagnosis must be stressed, prior to treatment, because Maples treated with iron, rather than manganese, will cause the symptoms to become more severe, since iron suppresses manganese uptake due to an iron-manganese antagonism.

Studies during 1975-1976 at Ohio State University have shown that with both Red and Silver Maple manganese will aid in preventing foliage chlorosis. The data in Tables 1 and 2 reveal that trunk implantations of capsules containing manganese sulfate will improve foliage color and increase both total chlorophyll and manganese levels.

Manganese sulfate capsules are in the marketing channels as Mn medicaps containing 28% manganese. As a result of these and other studies during the past several years, several related points should be made.

Treatments to be effective the season of application should be made prior to leaf growth in spring. In other words, implant during the winter months or early spring although implants can be made year round. Complete wound healing generally occurs if treatments are completed early in the season, while

Continued on page 36

Table 1 — The effect of limb implantation of manganese sulfate on Red Maple (Acer rubrum) 5 months from treatment April 29, 1975.

	Check	Manganese
Foliage color (1-10)[1]	5.0	9.0
Total chlorophyll (mg/g)[2]	170	226
Manganese content (ppm)[3]	193	499

1—Figures expressed on a 1-10 scale with 10 the darkest green.
2—Figures expressed as mg. total chlorophyll per g. of leaf tissue.
3—Figures expressed as elemental manganese in parts per million.

Table 2 — The effect of limb implantation of manganese sulfate on Silver Maple (Acer saccharinum) 6 months from treatment March 25, 1976.

	Check	Manganese
Foliage color (1-10)[1]	3.0	8.0
Total chlorophyll (mg))g)[2]	163	209
Manganese content (ppm)	69	153

1—Figures expressed on a 1-10 scale with 10 the darkest green.
2—Figures expressed as mg. total chlorophyll per g. of leaf tissue.
3—Figures expressed as elemental manganese in parts per million.

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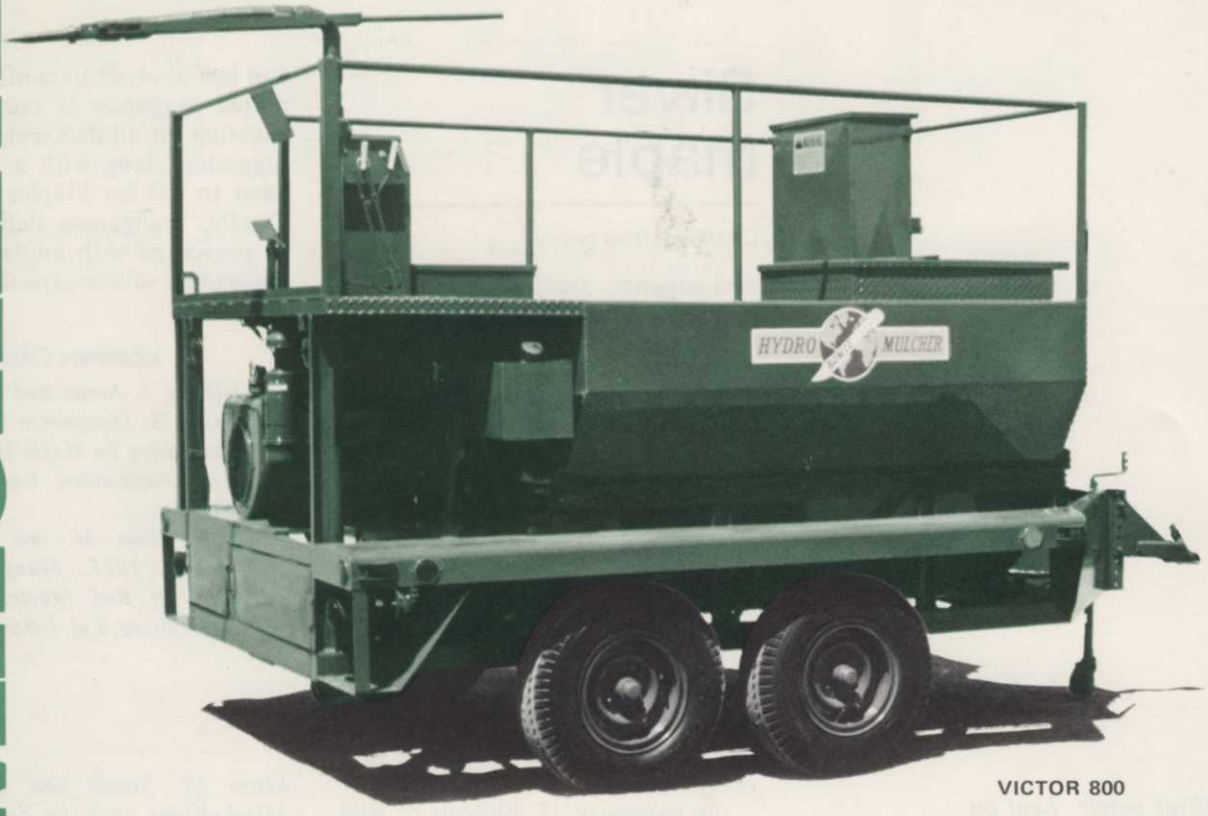

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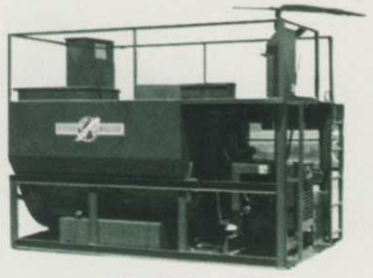

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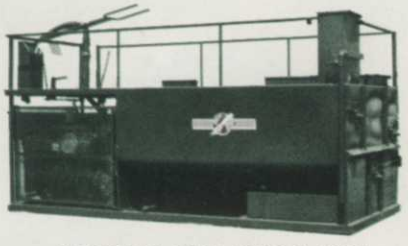

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Silver maple

Continued from page 32

mid-summer treatments may require 12-18 months to close.

Implants of the ½" capsules should be made in a spiral pattern around the base of the tree trunk. Effective control will not be possible unless the head of the capsules are inserted beneath the cambium to allow for proper cambium growth and healing.

Manganese deficiency of Maples can be corrected with other methods of treatment. However, capsule implantation is longer lasting than foliar spraying and more effective than soil treatments particularly in soils with highly alkaline pH readings.

In summary, if chlorosis of Red and Silver Maple is noted with the typical yellowish leaves with green veins the reason is quite likely manganese deficiency. A soil test and leaf analysis to confirm the suspected diagnosis is recommended. Treating for all deficient elements is suggested along with a pH adjustment to 6.0 for Maples is advised. Finally, manganese deficiency can be prevented with implantations of manganese sulfate capsules. □

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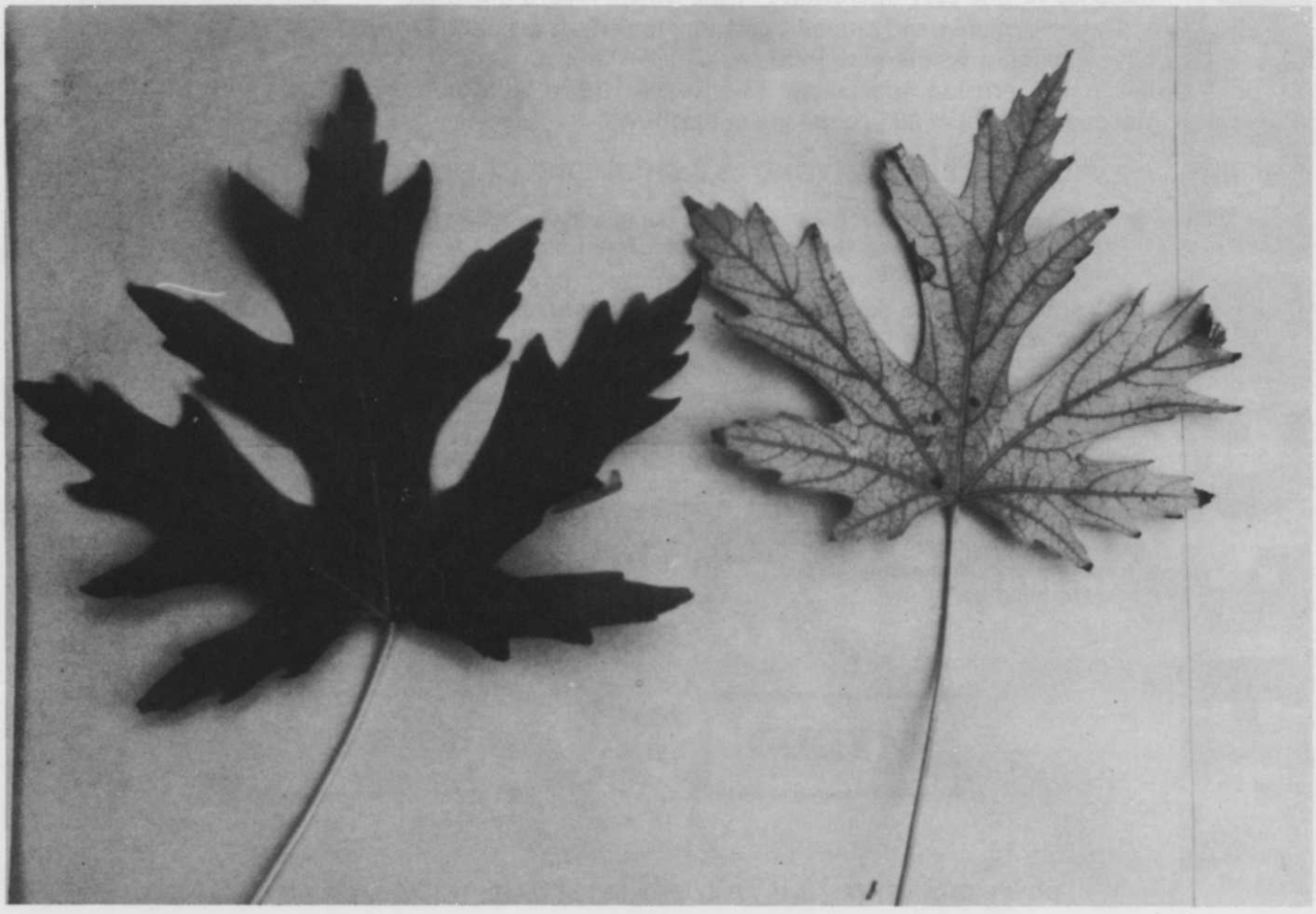
Elton M. Smith and Cynthia D. Mitchell are with the department of horticulture, Ohio State University, Columbus, and the Ohio Agricultural Research and Development Center, Wooster.



Silver maple. Leaf on left treated with MnSO4 capsules in March. Leaf on right untreated. Photo taken in September.

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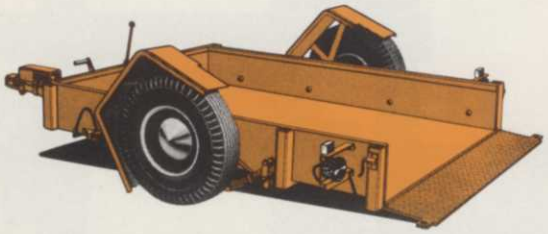

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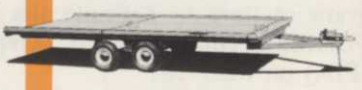

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The greening of Portland International Airport

Final touches were applied to a $405,000 exterior landscaping program in time to dedicate the new Portland International Airport (PIA) on May 16.

The redesigned and expanded PIA — six years under development and $71.8 million later — is a reflection of the casual and friendly Oregon lifestyle.

The landscaping project for the Port of Portland, the municipal corporation which owns and operates PIA, was completed by the Salem, Oregon contracting firm of L & R Landscape, Inc. William K. Roth, Portland landscape architect, served as consultant.

Landscaping around the newly expanded terminal involved planting 54,800 English plants for ground cover, 744 trees and 2,653 shrubs in areas encompassing 275,000 square feet, plus another 350,000 square feet of grass area.

The end product of this new landscaping in Oregon is, in the opinion of Dennis Roberts, PIA general maintenance supervisor, "probably the cleanest and greenest major airport in the country."

Shrub plantings at public approaches to the terminal included 1,341 rose bushes in four varieties to express Portland's legend of being the "City of Roses." In bloom this summer were 1,279 rosa floribunda, 25 European floribunda, 20 Elizabeth of Gaines floribunda and 17 Spanish sun roses.

The spring-summer color bloom also included 1,148 pearl Bradford azaleas.

Nursery-stock trees which were

Continued on page 40

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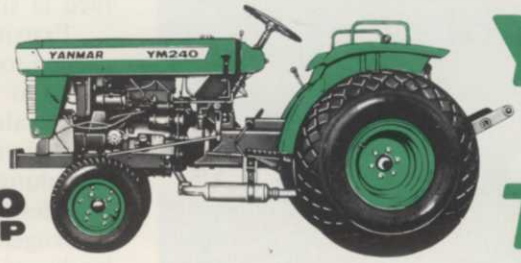

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Portland International

Continued from page 38

from 8 to 20 feet high when planted consisted of 401 Scotch pines, 104 thornless honey locust, 98 red maple, 87 shore pines, 73 Washington hawthorn, 45 flame ash and 34 purple leaf plum.

Irrigation for the plantings and lawns is provided by an automatically timed-by-zone sprinkler system with a network of an estimated 12 miles of Schedule 40 PVC pipe in diameter ranging from four-inch mains down to half-inch risers.

Initial landscape grading during new roadway construction to approach the Portland air terminal began five years ago. Landscape soil was riverbottom dredged sand, placed within six inches of the final grade.

Roberts said these soil preparation procedures followed: "We applied 50 pounds of gypsum per 1,000 square feet. Then we applied triple-16 slow-release fertilizer at the rate of 20 pounds per 1,000 square feet. (We are still using 10 tons a year of triple-16 at the airport.) Then we added eight inches of bark dust, plentiful in Oregon, and rotovated the dust into the soil from a minimum 5 inches to a maximum 13 inches. Then we raked to a finished grade.

"Grass was hydroseeded for a quick start and sprayed with a mixture of mulch for faster germination."

The lawn seed mixture by weight consisted of chewings fescue, 35 percent; Illahee creeping fescue, 30 percent; red creeping fescue, 25 percent; and Astoria bentgrass, 10 percent. Roberts said this mixture was determined to be favorable for soil and climate conditions at the airport.

Young trees are among 744 planted along approaches to the newly expanded passenger terminal at Portland International Airport.

New trees are being fed with Jobe tree spikes with 16-8-8 fertilizer, Roberts noted. These one-inch-diameter by six-inch-long spikes are placed at the base of a tree at the rate of one spike for every one-inch in tree-trunk diameter.

In addition to the newly landscaped areas of 625,000 square feet around the PIA terminal, another 2,000 acres of grass between and around aircraft runways are mowed by three men from the general maintenance crew. This outlying turf doesn't need to be as pretty, but specifications still apply.

Maximum growth along runways, for example, cannot exceed 12 inches. Roberts said he uses a 2-4-5-T weed killer along fences, as well as Simazine Precip 80-W ground sterilizer along fence lines and around runway and taxiway light fixtures.

A crew of four full-time men, aided by four students during the summer months, maintains the landscape in public areas around the air terminal. "Grass mowing is a constant job from April to November," Roberts said.

Equipment for the landscape crew includes three large tractors (a pair of 40-20 John Deeres and a Ford 8000) and a Ford 4000 to pull smaller mowers.

The John Deere tractors pull 25-foot wide Terrain King rotary mowers which fold into a 10-foot section for roadway transport. The crew also operates an 8-foot Mott flail-type mower; attached to each side of it is a self-propelled, high-speed Mott to produce a total width of 16 feet. Uses of this rig include trimming around runway and taxiway lights.

The PIA exterior landscaping contract was in addition to the $17.7 million spent over the past three years to expand the airport terminal building, which was nearly doubled in size to 446,150 square feet.

Expansion of PIA facilities was needed to serve swelling numbers of Portland air travelers using eight major airlines. The terminal was first opened in 1958 on its present site along the Columbia River and was designed to handle 1.5 million passengers a year. PIA passenger loadings in 1976 hit a record 3.3 million, far more than the state's entire population of 2.4 million. □

Buffalo plays ball thanks to seed company

Buffalo Mayor Stanley M. Makowski operates seeder in ceremony to begin reseeding of the city's 92 ball diamonds. With him, from left, are Glatt Glattly, Whitney-Dickinson representative; Parks Commissioner Gus Franczyk; and Anthony Gioia, chairman, Chamber of Commerce Buffalo Beautiful Committee.

When the City of Buffalo, New York dug out from under the worst winter on record, they found their softball and baseball fields virtually void of grass.

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Resistant red oak seedlings isolated

Resistance to oak wilt disease, for the first time, has been observed in red oak seedlings. The screening procedure, which scientists developed and used to identify the resistant seedlings, may insure that red oaks remain prominent in the eastern half of the nation, providing beauty and shade in urban and rural settings. But science has yet to find a way to insure that the species remains as an important hardwood lumber tree.

Scientists of USDA's Agricultural Research Service (ARS) at Madison, Wis., and their colleagues at the University of Wisconsin, screened more than a thousand seedlings from which they found 17 that were resistant.

"These seedlings developed no oak wilt symptoms after we used a hypodermic needle to inoculate them with the fungal-disease causing organism in 3 successive years," said ARS plant pathologist Richard D. Durbin.

Further research is being conducted to find whether the seedlings may still succumb to infections by natural agents such as beetle.

Efforts to identify resistant red oaks in nature are hampered because exacting conditions necessary for disease spread may not be present at many times, says Dr. Durbin. The preliminary screening procedure makes testing of large numbers of seedlings possible in the greenhouse.

"If the promising results of our screening are further confirmed, resistant red oaks could be multiplied in sufficient numbers for the nursery trade within a few years," says Dr. Durbin. But some basic stumbling blocks must be overcome before they can be increased in large numbers.

In their search for ways to mass produce the disease-resistant red oak, the scientists are trying to develop several vegetative techniques including tissue culturing and rooting. "Reproducing the red oak sexually is not a viable alternative," says Dr. Durbin, "because we would have to wait 30 to 40 years for the trees to develop sexual maturity." Genetically, red oak trees are so complex or heterogeneous that many of the offspring would not be resistant anyway.

New techniques for vegetatively propagating the resistant oaks — if they can be developed soon — will be most timely. Dr. Durbin notes that oak wilt has spread alarmingly during the past three decades in eastern and central states where oaks are the leading hardwood timber species and important as shade trees. Some researchers have predicted that within the next 30 years about half of the nation's oak trees will be afflicted. □

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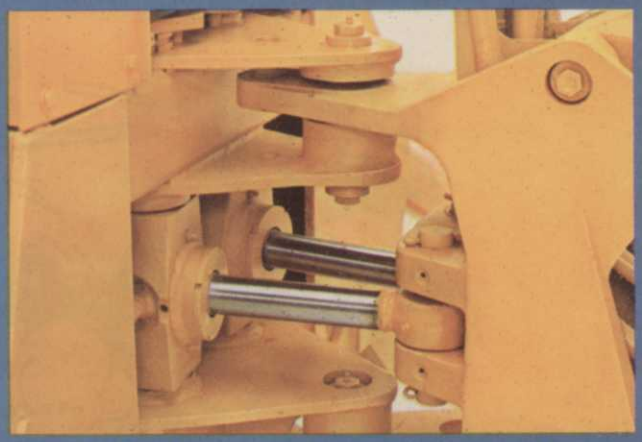

The 9250-A Backhoe utilizes dual swing cylinders that provide 11,083 foot-pounds of swing torque.

Loader booms are reinforced at the arch point with the plate applied to *both* sides of the boom. Slotted mounting point (arrow) permits horizontal float.

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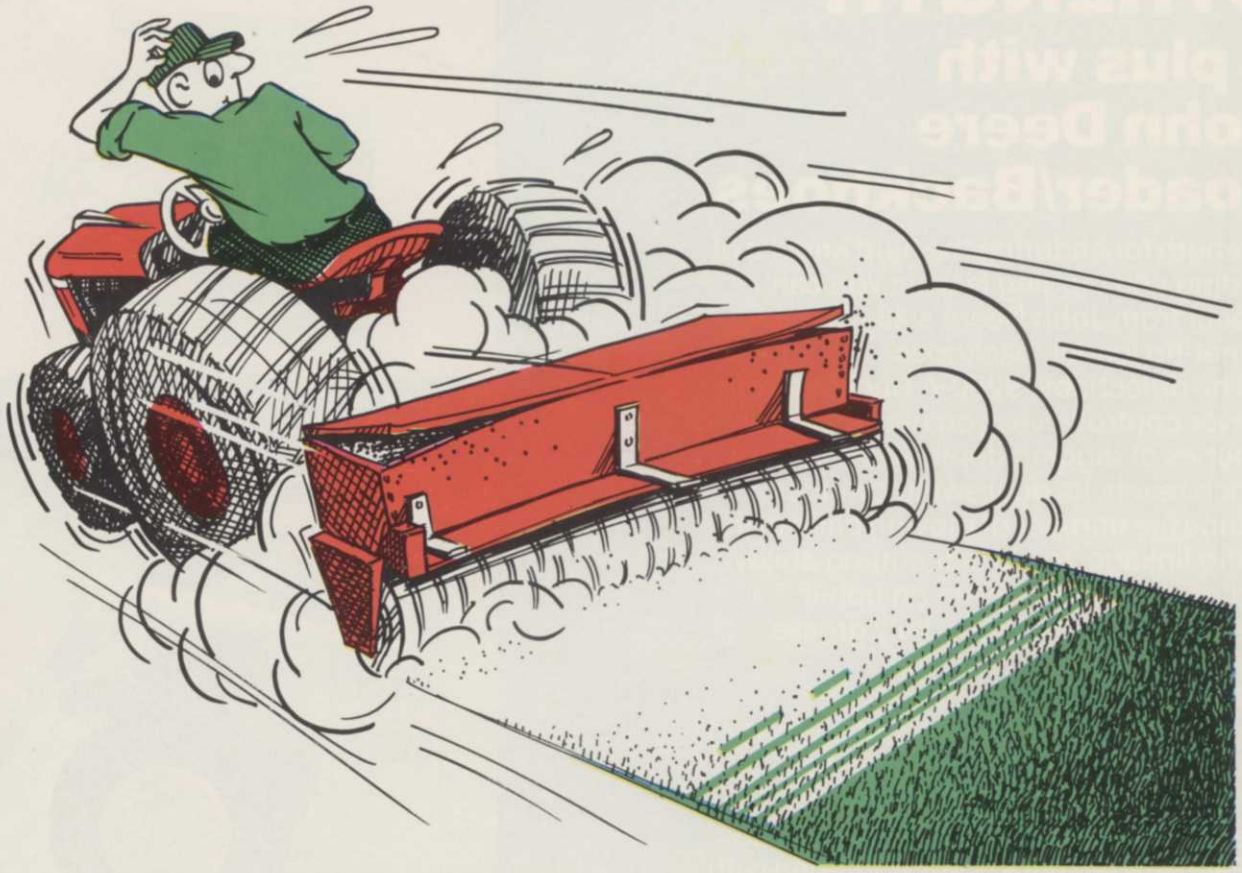

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Effluent water

Continued from page 14

on greenbelt irrigation using sewage effluent performed by Younger of UC Riverside (in collaboration with the U.S. Forest Service), is among the most basic research projects yet accomplished. This investigation, in the famed Lake Arrowhead region of California, demonstrated no evidence of degradation or contamination of surface or ground waters, after 5 years of monitoring. The implications for golf course irrigation are encouraging, and more specific research on turfgrasses will doubtless benefit from this cornerstone work. Figure 3 illustrates a student withdrawing a ground water sample in this Lake Arrowhead project.

Economics of waste water reuse is a subject of secondary importance to most researchers, yet necessarily concerns the average golf course superintendent contemplating use. A more definitive answer may be the result of a new research grant to Younger of UC Riverside from the Office of Water Research & Technology, Department of Interior. Commencing this Fall, two graduate students under Younger's direction will compare costs of processing, piping and discharging effluent using this technique, with the costs of disposing by alternate means (as, to the ocean) and the economic value of water recovered.

In considering the economics of waste water effluent, even on a shirt cuff basis, some credit should be given to the fertilizer ingredients which accompany it when used in irrigation. Thus, as characterized by Dr. Wade L. Berry of UCLA's Department of Nuclear Medicine, a typical urban effluent can add 4 lb. of nitrogen, 2.7 lb. of phosphorus and 2.3 lb. of potassium, for each acre-inch applied. In the Southern California area, where approximately 40 acre-inches of water are needed to replace evapotranspiration losses, this level of use would add 160 lb. of nitrogen, 108 lb. of phosphorus and 92 lb. of potassium each year.

"In most instances," he concludes, "this would supply more phosphorus and potassium than presently used and also most of the nitrogen for low use turf, although additional nitrogen would be needed, especially for high use turf." At today's fertilizer prices, this deduction can be very helpful.

It is true that irrigation lines, pumps and storage facilities may cost additional dollars because of special needs to filter, chlorinate and contain a more corrosive substance. However, even if this waste effluent must be purchased, this expense may be only an estimated 1/3 of domestic water costs. If a separate filter system is required at the golf course site, Laguna Hills superintendent John Polder estimates a cost of $5,400 for a 1,000 gpm automatic system, or $4,000 for a manual

Continued on page 48

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Effluent water

Continued from page 45

back-flush system (plus installation charges).

"When all these things are weighed," concludes Younger of UC Riverside, "you can't help but conclude that it will be economical." A rather unequivocal statement for most scientists! However, Younger has plenty of specific research behind him to back up this conviction. He believes that this is just as true for a governmental agency, which charges for its effluent water, as it is for the golf course user who must pay for it. No doubt, in drought-plagued California, Younger is as impressed with the need to conserve a precious commodity, as with the relatively low costs and economic attractiveness.

Soil preparation key consideration

Needless to say, soil preparation is important where effluent water is to be used. Sandy loams are generally preferable; clay or sands are to be avoided. If greens are constructed according to USGA specifications, clay soils will be avoided and good percolation and drainage will assure less salt accumulation. Internal drainage lines will help this desirable flow.

As a starting point, Professor Younger highly recommends a thorough soil survey. In some cases, a site may be unsuited to effluent usage. Thus, a shallow soil over rock or hardpan may cause inadequately purified water to move horizontally into surface waters or through rock fissures into ground waters. He advises that infiltration rates and hydraulic conductivity of the soil be determined in advance, so that water application rates can be adjusted to avoid surface runoff or ponding.

A special problem is created by a water having a high sodium absorption ratio (SAR), in the presence of a clay soil. Such soils may lose their structure in time and become very poor for plant growth or water purification. Sodium acts to deflocculate soil, which then becomes compact and a poor hydraulic conductor. Gypsum is sometimes successful in correcting this situation, although avoiding this combination is preferable.

To illustrate how much difference is possible in soil readings following effluent irrigations, we may consider the Laguna Hills Golf Course in Southern California. Here, soil test data kept since 1971 show an increase of up to 125 percent in SAR readings, for a clay soil irrigated with effluent water as compared to irrigation with Metropolitan water. Similarly, increases in EC readings up to 100 percent have been noted, particlarly after summer irrigation with effluent. However, readings for SAR below 5.0 or EC below 3.5 are considered satisfactory by Laguna Hills maintenance personnel.

In setting up a waste water irrigation program, Younger recom-

Continued on page 56

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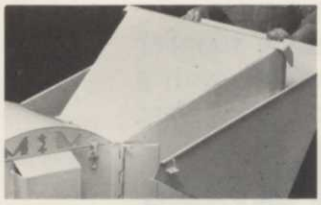

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National Association of Plant Patent Owners, The Olympic Hotel, Seattle, Wash., July 18.

National Landscape Association, The Olympic Hotel, Seattle, Wash., July 18.

Horticultural Research Institute, The Olympic Hotel, Seattle, Wash., July 19-20.

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AAN Management Seminar, Callaway Gardens, Pine Mountain, Ga., Aug. 21-26.

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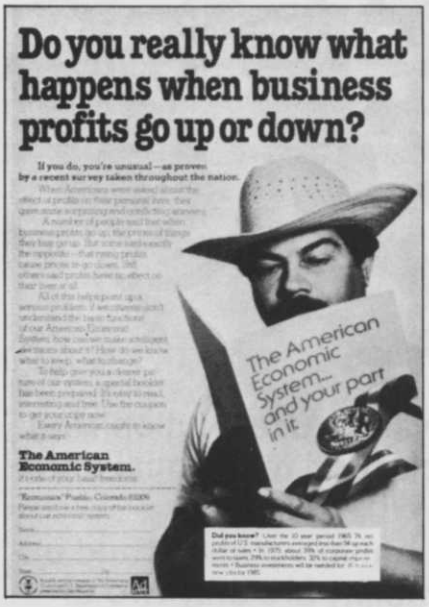

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Effluent water

Continued from page 48

mends not only a soil survey, but a complete water analysis as well. Local test laboratories are available for this purpose. With these data, knowing the rate of soil infiltration and the chemical contents of waste effluent, the golf course superintendent can decide upon a proper precipitation or irrigation rate. This will be less than the rate of infiltration, and low enough (or applied intermittently) so as to prevent runoff. Younger also recommends use of automatic controllers, to regulate flow rate and application time. "There are many on the market," he comments, and mentions Toro Manufacturing, Rain Bird, Royal Coach and Moody Sprinklers as typical California suppliers.

Continuing use of soil, water and plant tissue testing is recommended by Younger, to identify effects of accumulated salts, and to insure proper fertility practices for plant nutrition, color and vigor. Using the "living filter" system, all clippings should be removed, to prevent recycling of impurities from decomposition.

Government regulations slow development

One fly in the ointment of waste water usage in general is the increasingly strict regulation by various governmental agencies. In California, the State Water Resources Board and Department of Public Health set and administer standards (through regional water quality control boards) which some users consider "too tight." This has held up reclamation. Originally scheduled to double from 1974 to 1976 in Southern California, water recovery is today almost unchanged (at only about 6 percent of over 700 M.G.D. discharged to the ocean), according to William Garber of Los Angeles City's Bureau of Sanitation.

"With the present state of knowledge," according to John N. English of EPA's Cincinnati labs, "the greatest potential health hazard appears to be that associated with trace organic materials, and the composition of the organics and their toxicity must be defined. The second most significant problem," he continues, "is that of pathogenic organisms, especially viruses, and heavy metals that contribute to the health hazard." It appears likely that standards applied to potable water recovery may not be strictly applicable or applied to golf course irrigation. □

Harold LeSieur is the principal of his own management consulting firm in Santa Maria, Calif. He holds an M.S. degree in engineering from the University of Southern California and an MBA degree from Stanford University.

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- Available in bulk **or** in 44 lb plastic bags.

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Name ..... Company .....

Address .....

City .....

State ..... Zip .....

Mail to: A. M. (Gus) Peesker, Marketing Manager
Professional Turf Products
Canadian Industries Limited
P.O. Box 5201 London, Ontario, Canada
N6A 4L6 Telephone: (519) 672-9220

A dependable source of supply of quality products, in commercial quantities, from Canada's largest chemical company

C·I·L

Canadian Industries Limited

PRINCETON

the "New Concept" People

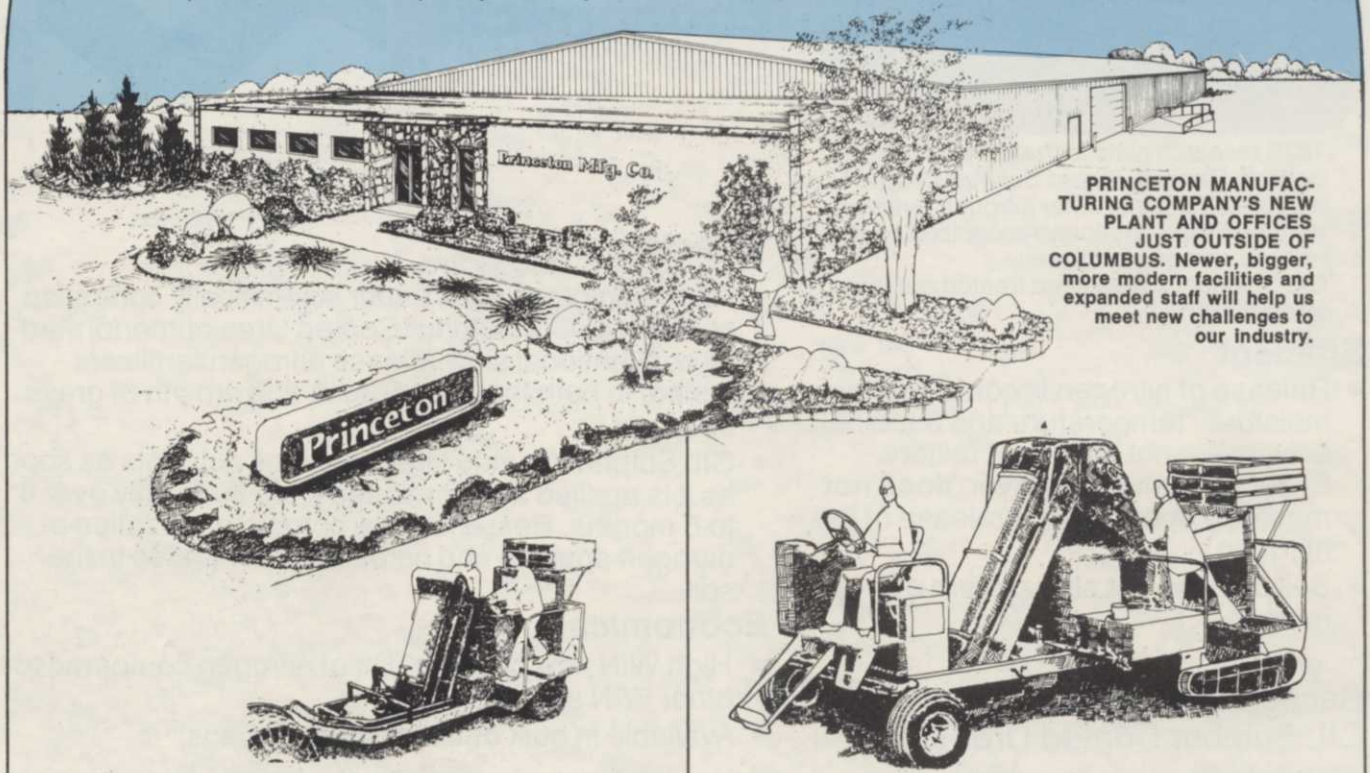
We revolutionize tradition with innovation.

1977 will be the year of the greatest advancement the sod industry has ever known. Princeton is the reason. We're moving . . . bigger in every way. Moving to a bigger, brand new manufacturing plant . . . a production facility that will help us meet your overwhelming demand for Princeton Manufacturing Sod Harvesters and Nursery Equipment.

Moving into an even wider selection of revolutionary sod and nursery products.

Princeton experience and the quality of our products has made us the most trusted name in the Sod Harvesting and Nursery industries. Our unique technical skill has enabled us to tackle the many challenges of our industry . . . finding solutions to the problems of inefficiency . . . excessive, costly down-time . . . inadequate production and soaring labor costs. We did it! Now, we're doing *much more!*

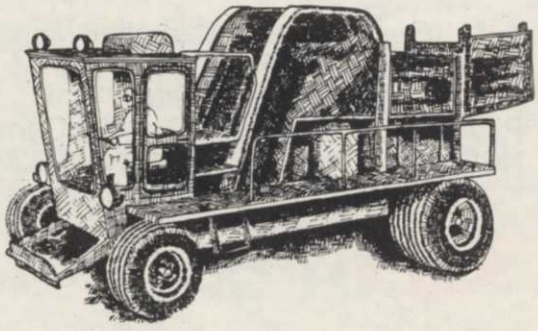
We are proud of the reputation that Princeton has earned. We are grateful for your trust and acceptance. We will continue to live up to this trust.



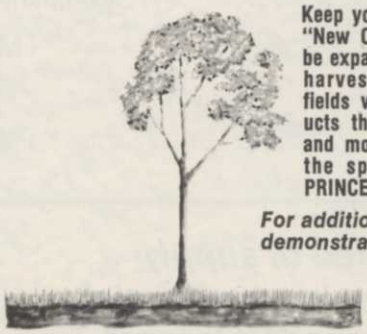
PRINCETON MANUFACTURING COMPANY'S NEW PLANT AND OFFICES JUST OUTSIDE OF COLUMBUS. Newer, bigger, more modern facilities and expanded staff will help us meet new challenges to our industry.

The first, and finest, low-priced, high-output, cost and labor saving harvester, 108,000 square feet of sod harvested per day with three man crew. The PRINCETON "TOW BOY" Sod Harvester.

Reduced costs and increased production mean bigger profits. Three man crew can harvest up to 180,000 square feet of sod per day with the PRINCETON SELF-PROPELLED Sod Harvester.



The only sod harvester that does it all . . . with just one man! Harvest up to 216,000 square feet of sod per day, with a crew of one. The PRINCETON AUTOMATIC Sod Harvester.



Keep your eye on Princeton . . . the "New Concept" people! Soon, we'll be expanding our services in the sod harvesting, nursery, and related fields with revolutionary new products that will mean greater profits and more efficiency to you. In '77, the spectacular will come from PRINCETON!

For additional information or demonstration, write or call collect:

Chuck Braun
Sales Manager
955 W. Walnut Street
Canal Winchester,
Ohio 43110
(614) 837-9096

PRINCETON
MANUFACTURING COMPANY

Circle 131 on free information card

People on the Move

Hustler Turf Products at Excel Industries, Inc. has added two regional sales managers. **William "Pat" Patton** will be responsible for covering sales in a 15-state Central USA region. He has been sales and marketing manager for Deines Corp. for the past two years. **Jack Parker** will cover a similar region in the Western U.S. He moves to Excel from the Hesston Lawn Equipment Division.

Howard Cooper has been named marketing research manager of the Turf Products Division, Jacobsen Manufacturing Co. He will be responsible for marketing analysis and forecasts, including field studies for new turf product developments. Cooper holds an MBA degree from the University of Michigan. Ann Arbor.

Great Lakes Biochemical Co., Inc. has announced two new salesmen. **Bob Rothacker** will cover California, Oregon, Washington, Arizona, Nevada, Idaho and Utah upon the retirement of Bob Flowers. Rothacker has been manager of the institutional industrial division of Drackett Products Co. for the past 10 years. **Doyle W. Head** will cover Ohio, Kentucky, Indiana, Michigan, West Virginia and Western Pennsylvania. He has over 13 years of experience in sales, plus university courses and seminars on business administration and sales management.

Richard J. Dittoe has been named domestic sales manager of the Turf Products division, Jacobsen Manufacturing Co. He will be responsible for North American and government sales, advertising and sales promotion, sales training and demonstrations, and customer order service.

Herb Cole has been promoted to area manager for the Northern Midwest region of Lakeshore Equipment and Supply Co. Formerly a sales representative in the northwest Ohio-southwest Michigan area, Cole has been with Lakeshore over 14 years.

William "Butch" Cauthen has been promoted to field product manager at Thompson-Hayward Chemical Co. He will be responsible for sales, training and determining product lines for pest control and fumigation products. He has been with Thompson-Hayward for 8 years and has been a pesticide sales representative in Birmingham, Ala.

FLAIL SAFE

When your job is grounds maintenance year around, you need a mower for all seasons.

With one **VERSATILE** Mott mower, you can mow fine lawns, shred high grass and weeds, mulch leaves and renovate.

Flail type mowers have a reputation for being **SAFER** than rotary type mowers. Mott mowers... with their lightweight knives... are the safest of the flails.

Mott mowers also offer **COST EFFECTIVE PERFORMANCE** because they last longer and are more reliable to operate.

Write or call for information about **YOUR MOWING REQUIREMENTS.** This season and every season, mow Flail Safe... with Mott mowers.

"Tell me more about FLAIL SAFE mowing."

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____

mott HAMMER KNIFE

MOTT CORPORATION

514 Shawmut. La Grange. Illinois 60525. (312) 354-7220

Circle 139 on free information card

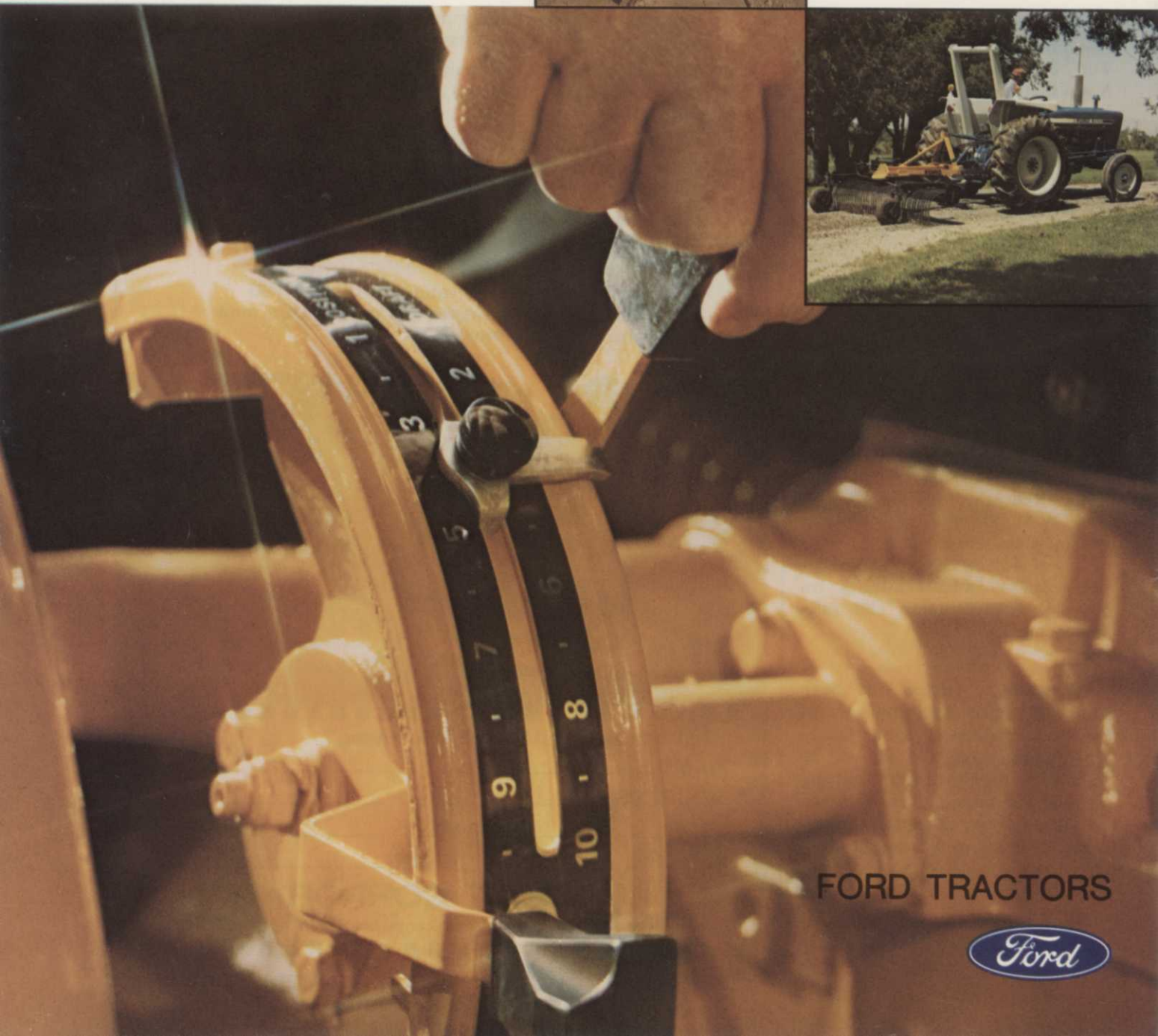
PRECISION HYDRAULIC CONTROL

FORD TRACTORS

Ford hydraulic lift system offers precision control for landscaping and soil preparation. Equipment responds smoothly and accurately with fine increments of adjustment. With 8.5 gpm hydraulic pump, you get fast, positive action for remote hydraulics, side-mounted cutterbar mowers, utility loaders and other equipment. Count on your Ford tractor and equipment dealer for sales and service. He's listed in the Yellow Pages under "Tractor Dealers".

Versatile twin-lever control system allows three types of response: 1. Position control. 2. Draft control. 3. Position and draft control working together to limit maximum depth of equipment in widely varying soil conditions.

8.5-gpm pump and twin-lever hydraulic control are standard on Ford 32- 52 PTO horsepower all-purpose tractors; optional on other Ford 3-cylinder tractors (except orchard, vineyard).



FORD TRACTORS

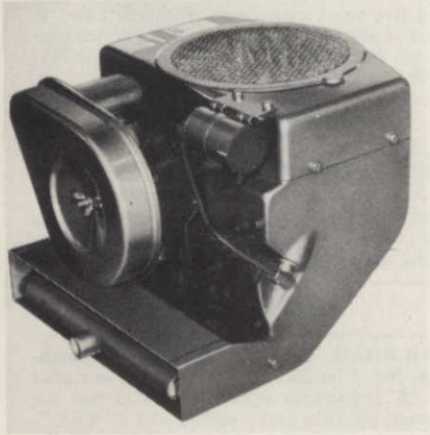
Ford

Products

FMC's new high performance Wayne Model C12 and C16 brush chippers are powered by 318 cu. in. V-8 engines. Combined with a six-sided bed knife, power is provided to slice heavy brush and limbs into small clean chips of high commercial quality.

The forged steel rotor of FMC's new brush chippers has the structural strength to permit the blades to be positioned at the precise angle for slicing, no chopping. Both models meet or surpass all current OSHA noise requirements under normal operating conditions.

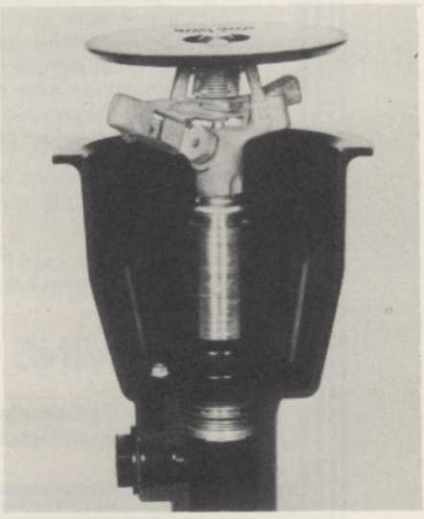
Circle 701 on free information card



A new line of two-cylinder, vertical shaft engines is being introduced by Kohler Co. Model K252, 8-HP, and model K272, 10-HP, are the first. The engines are four cycle, L-head, air-cooled with opposed cylinders, and a low, symmetrical profile.

Kohler Co. has engineered a muffler to reduce exhaust, an air intake system to subdue intake noise, and a direct air design that makes it easy for an equipment manufacturer to enclose the engine for even quieter operation. Service components are accessible from one side or the top of the engines for ease in servicing.

Circle 702 on free information card



A new, improved rotary pop-up, impact sprinkler, Model 10010, manufactured by Royal Coach Sprinklers, Inc. is believed to be the smallest rotary now available.

The sprinkler has an all new brass spindle for longer life and smoother operation. Buna-N elastomeric scraper keeps the spindle clean for positive retraction. The sprinkler operates in the 35-50 pound pressure range and covers 78 to 83-foot diameters.

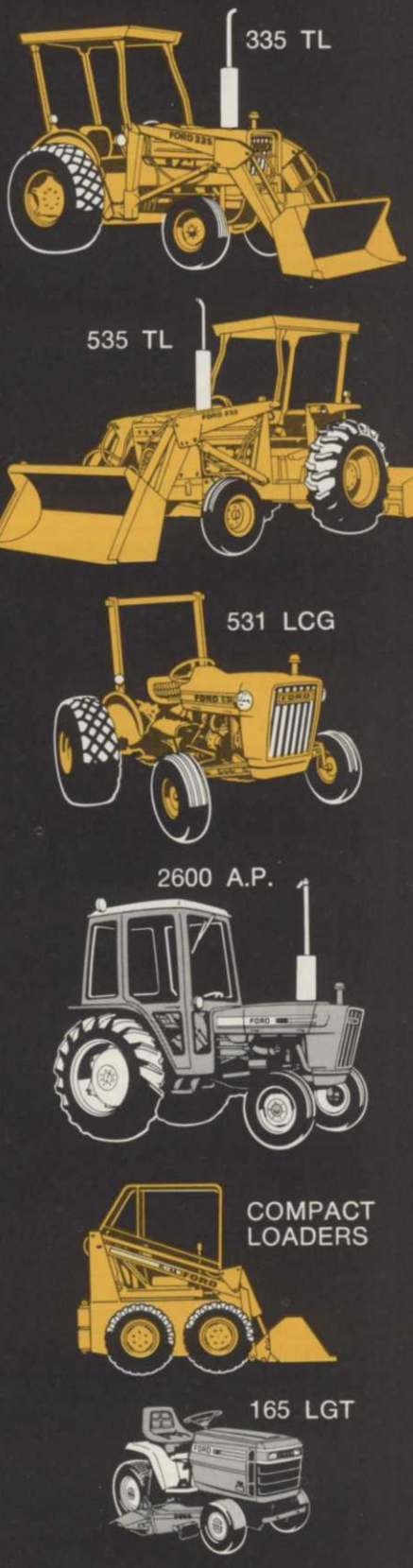
Circle 703 on free information card

STPL Black, a new factory perforated high-density polyolefin liner, has been developed by Sto-Cote Products, Inc. Crosslaminated plies of polyolefin gives the liner its toughness. Tests have shown the liner to be highly resistant to rips, punctures, and snags. The film also resists penetration by roots, rocks and weeds.

Circle 704 on free information card

Circle 106 on free information card

Ford power for grounds maintenance



See them now!

Classifieds

When answering ads where box number only is given, please address atas follows: Box number, c/o Weeds Trees and Turf, Dorothy Lowe, Box 6951, Cleveland, Ohio 44101.

Rates: All classifications 65¢ per word. Box number, $1. All classified ads must be received by Publisher the 5th of the month preceding publication date and be accompanied by cash or money order covering full payment. Mail ad copy to: Dorothy Lowe, Weeds, Trees & Turf, P.O. Box 6951, Cleveland, Ohio 44101.

USED EQUIPMENT

2 — 50' AERIAL BASKETS — 65 Aerial basket, 2 Asplundh brush chippers. 1 Vermeer tree mover, 1 Vermeer stump cutter. Small hydraulic crane, 2 John Bean sprayers, ten ton tri-axle trailer, 1 Prentice log loader, tractor with front end loader and Bobcat loader, Parkway Tree Service, 120626 W. Cherry, Wauwatosa, Wis. 414 257-1555.

FOR SALE—1,000 gallon skid mounted sprayer — 16 horsepower B/S electric start, baffled fiberglass tank, full mechanical agitation, max 180 PSI, 60 GPM centrifugal, electric hose reel, 400 ft. ⅜" hose, steps and cat walk. Will deliver 40 PSI at gun end 400 ft. hose. P.O. Box 3, Rockton, Ill. 61072. Phone: 815 624-7545.

SEVERAL 50 FOOT SERVI-lifts mounted on GMC trucks. Call 401 725-2250.

FOR SALE — 1975 Vermeer TS-22" tree spade. Mounts on Bobcat or 3 pt. hitch. Excellent condition. $1800.00. 1976 Care tree 30" tree spade. Mounts on Bobcat or 3 pt. hitch. Mint condition. $2995.00. 1976 Care tree 36" tree spade. Mounts on 990 Bobcat, tractor, loader, or dozer. Mint condition. $4495.00. 1972 Vermeer TS-44T tree spade on 1974 GMC 1 ton. New spades. Good condition. $7800.00. Will send photographs upon request. Call or write: Spartan™ Tree Transplanting Equipment Company, 16084 S. Chandler Rd., East Lansing, Michigan 48823. Phone 517 351-1370. (We buy, sell, and repair high quality tree transplanting equipment).

FOR SALE: Vermeer TS 30 mounts for Bobcat $2,995, TS 44 trailer mount $4,995, 610 Bobcat $5,495 steel tracks for Bobcat, 5' Brillion seeder, 1200 gallon chemical lawn fertilizer applicator $1,500. Lawn & Turf Landscaping, Inc., 6136 Winchester Road, Fort Wayne, Indiana 46819, 219 747-3298.

FOR SALE: Reinco Hydro Seeder, H.G. 8, excellent condition, one year old, $5000.00. Mounted on 1970 International with steel 14' bed. Will sell truck and body for $3000.00. Call Antietam Tree Service, Hagerstown, Maryland, 301 731-2553.

TREE DIGGER For Sale. Model M50 Vermeer Tractor with front end loader 30" and 40" spader, price $13,500. Call J. Rosenfelt (215) 375-5742 or write: Terrain Realty, 35 N. 6th Street, Reading, Pa. 19601.

VERMEER STUMP CUTTER Model 6524 $5,000.000 Asplundh 16" chipper, both A-1 shape $4,500.00. Joe Little Tree Service, Tulsa, Oklahoma 918 743-8434.

FOR SALE Several 40 to 50-foot Skyworkers. One 32-foot work-ing height Sky-jacker and truck. Phone: Aerial Lift Repair, Inc. 203 878-0695.

USED CHIPPERS AND AERIAL BUCKETS. Call P. C. Gould Sales Co., 203 767-1636 and ask for Phil or Jeff Gould.

FOR SALE: Bean Rotomist $9,000.00 303 284-6377.

LARGEST VERMEER STUMP REMOVER, model 2460, excellent condition, $4,000. Tamke Tree Experts, Martinsville Road, Liberty Corner, New Jersey 07938. 201 647-3537.

HELP WANTED

LANDSCAPE MAINTENANCE SUPERINTENDENT

The Grass can be Greener . . .

Our dynamic and progressive firm, located in Orange County, seeks a hard-hitting 2nd Level supervisory pro who can manage an active project maintenance staff. Areas of expertise must include horticulture maintenance, general facilities maintenance, middle management experience and a proven ability to build strong tenant relations.

Interested candidates are invited to submit resumes, including current salary details, in confidence, to:

Richard F. Goff
Personnel Administrator

THE IRVINE COMPANY

1071 Camelback Street
Newport Beach, CA 92663

SALES HELP WANTED — A.A.A. Tree Service looking for men with sales experience. Year round work, age no factor, also tree climber with or without own equipment. Also looking for men with experience with Mauget Tree Injections. Henry Hardy, P.O. Box 6173, Orlando, Florida 32802. Phone 339-5242.

WE ARE A 50-year-old New England Company providing arborist and landscaping services for the homeowner and instutional markets. Our reputation for delivering consistent high quality in workmanship is providing us with increasing opportunities to expand our business. To capitalize on these opportunities, we are planning to enlarge our sales staff. Qualifications we are seeking include college training, with a degree related to the horticultural field preferred. We seek, also, significant "in the field" arboricultural and landscaping experience, and the attainment of the position of foreman or crew leader will be a decided plus. Finally, applicants should have strong communication skills, particularly in one-on-one situations. Our employees have been informed about this advertisement. Please send resume and compensation requirements to: Box 173, Weeds, Trees and Turf, P.O. Box 6951, Cleveland, Ohio 44101.

WANTED: Landscape architect, landscape foreman and landscape maintenance foreman. Our landscape contracting firm is expanding and I am looking for experienced, trained candidates for the above job openings. College degree in the horticultural field and five years experience required. Lawn & Turf Landscaping, Inc., 6136 Winchester Road, Fort Wayne, Indiana 46819, 219 747-3298.

SEEDS

SOD QUALITY Seeds Merion, Fylking, Delta, Park, Newport, Nugget, Adelphi, Cheri, Glade and Baron bluegrasses also fine fescues. Manhattan rye grass. Custom mixing available. Michigan State Seed Co., Grand Ledge, Michigan 48837. Phone 517 627-2164.

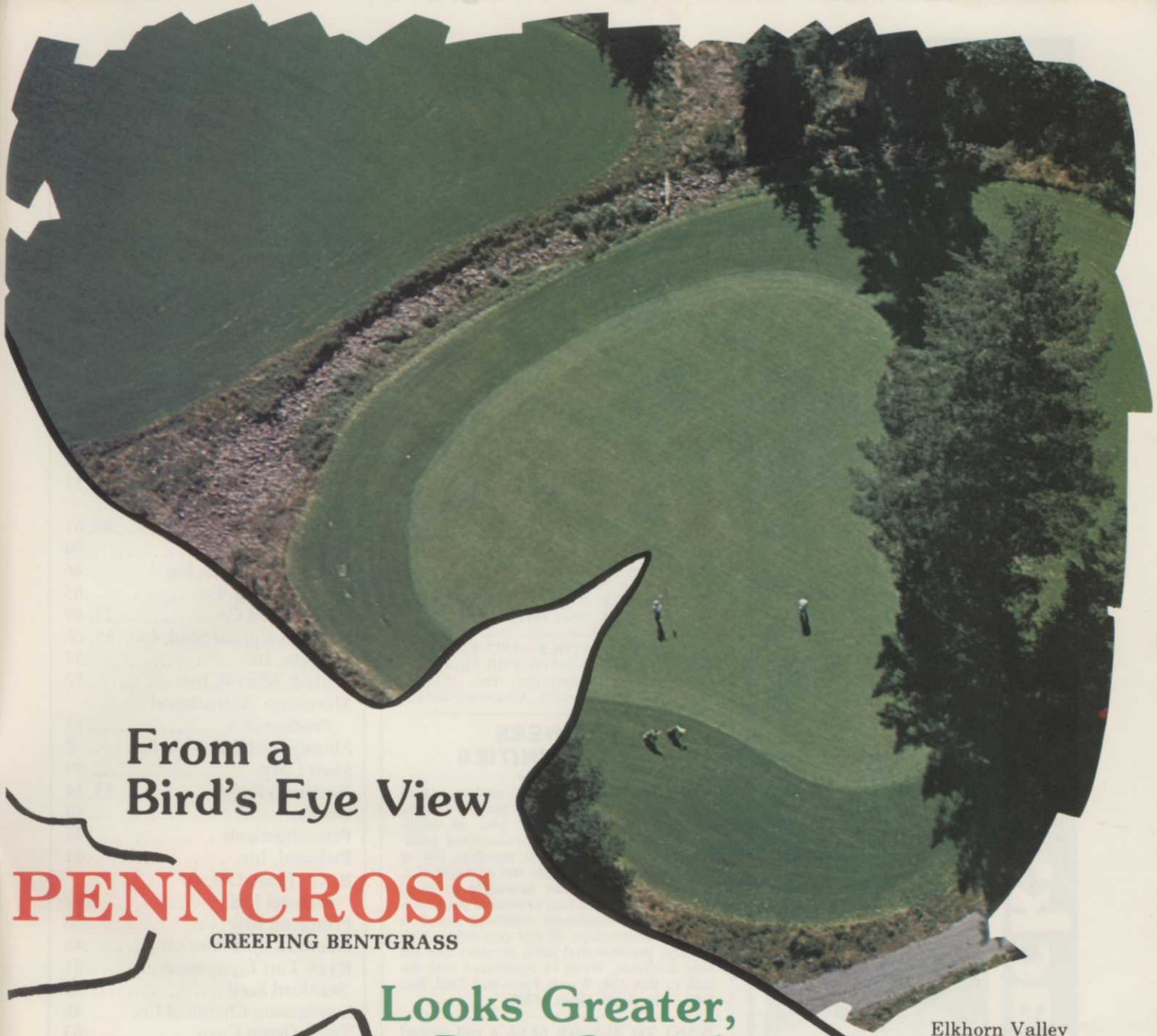
NURSERY STOCK

8-10' WASHINGTON HAWTHORNES, 4-5' Royalty Crabs, 5-6' Armour Maples, 4-5' Red Jade Crabs. Lawn & Turf Landscaping, Inc., 6136 Winchester Road, Fort Wayne, Indiana 46819. 219 747-3298.

FOR SALE

RAILROAD TIES, 20,000 excellent condition, No. 1 landscaping ties banded in stacks of 25. (minimum order 250). The ties are square, uniform and measure 6" x 8" x 8½". We make immediate delivery or arrange for your pick-up. Inquiries welcomed 7 a.m. to 7 p.m. Monday through Saturday, call Curt Schopp at 317 896-3333, Midwest Track Salvage, R1, Box 198, Westfield, Indiana 46074.

FOR SALE complete tree service company on West Coast. Grosses over $350,000.00 per year. Good potential for expansion. 26 pieces of equipment, plus office equipment and miscellaneous tools and equipment. Box 164, Weeds, Trees & Turf, P.O. Box 6951, Cleveland, Ohio 44101.



From a Bird's Eye View

PENNCROSS

CREEPING BENTGRASS

Looks Greater, Putts Straighter

Elkhorn Valley
Golf Course
Mehama, Oregon

The putting grass superintendents prefer. Easy to establish, lower maintenance costs.

FOR FREE TURFGUIDE, WRITE
PENNCROSS BENTGRASS ASSOCIATION
1349 CAPITAL ST. N.E.
SALEM, OR 97303

PENNCROSS BENT GRASS

WORLD-WIDE DISTRIBUTOR
TEE • 2 • GREEN CORP.
1212 WEST EIGHTH STREET
KANSAS CITY, MISSOURI 64101
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Terra Tack: Erosion Protection

Terra Tack holds mulch in place for erosion control of newly seeded areas by forming a water insoluble, gelatinous locking membrane.

Can be used to bind hay or straw and to secure wood or paper fiber mulches.

Terra Tack formulations are packaged in powder form and are mixed on the job site. Only 40 pounds needed per acre. Storage and transportation costs are at a bare minimum.

Saves equipment. . .
Saves manpower. . .
Gets results!

Untreated Soil

Terra Tack Treated Soil

Grass Growers

P. O. Box 584
Plainfield, N.J. 07061
(201) 755-0923

Circle 126 on free information card

Classifieds

Continued from page 62

FOR SALE

TREE SERVICE FOR SALE due to health. Been in business 18 years. More than I can handle. Asking $30,000.00. 8 pieces of equipment, all good shape. For more information write Frank's Tree Service, 2490 Fisher Rd., N.E., Salem, Oregon 97303 or phone 363-2594 Salem.

1972 HiRANGER Mounted on 1973 1600 International Flatbed with cross boxes — $22,000. 1972 1600 International with combo unit HiRanger — $16,500. 1975 HiRanger on 1975 F-700 Ford — $28,500. Seattle, Washington 206 325-1529.

1966 ASPHLUND CHIPPER 4-cylinder 12" $3,100.00. 1972 Mitts Merrel V-8-16" $3,-200.00. Both fully reconditioned. Edwards Tree Service, 3190 Cooper-Foster, Vermilion, Ohio 44809. 216 967-6750.

COMPLETE TREE CARE and lawn/ornamental spray service company. Established 17 years in sunny Southwest. Grosses $235,000. Box 172, Weeds, Trees, and Turf, P.O. Box 6951, Cleveland, Ohio 44101.

DEALER OVERSTOCK—1977 Yazoo YR-48's still crated, $1,895.00. FOB Milwaukee, Wisc. Kujawa Enterprises, Inc. 3630 E. Munkwitz Ave., Cudahy, Wisconsin 53110.

BUSINESS OPPORTUNITIES

ATTENTION: Lawn care services, landscape nurseries, lawn and garden co-ops, landscape con-trctors. Are you an established lawn and garden professional products user with a good credit standing, having a minimum of 500 square feet of clean, dry, available storage space accessible to small truck pick-ups, and care to expand your business without additional overhead costs? A few distributorships of our profitable, high quality, pro-fessional lawn product line are now available. Write in confidence with details to Box 174, Weeds Trees and Turf, Box 6951, Cleveland, Ohio 44101.

WANT TO BUY OR SELL a golf course? Exclusively golf course transactions and appraisals. McKay Golf & Country Club Properties, 15553 N. East St., Lansing, Michigan 48906. Phone 517 484-7726.

A.A.A. Tree Service has a business opportunity for you in Florida. Call or write Henry Hardy, Jr., P.O. Box 6173, Orlando, Fla. 32802. Phone 339-5242.

EXPANDING CONNECTICUT TREE Service is seeking a success-oriented owner/manager for one local franchise. Full training is available to the right individual, plus company support and supervision. This opportunity offers independence and an excel-lent income. Our free booklet explains it in detail. Call or write: Dogan Tree Service, Inc., 365 South Main Street, Deep River, Connecticut 06417; 203 526-5000.

RETAIL LANDSCAPE BUSINESS—Rural Small city, established 25 years, limited competition, excellent reputation, good earnings. Operator with seasonal help. This is an affordable chance to be your own boss. Arbor Grove Co., R2, West Liberty, Ohio 43357. 513 465-5212.

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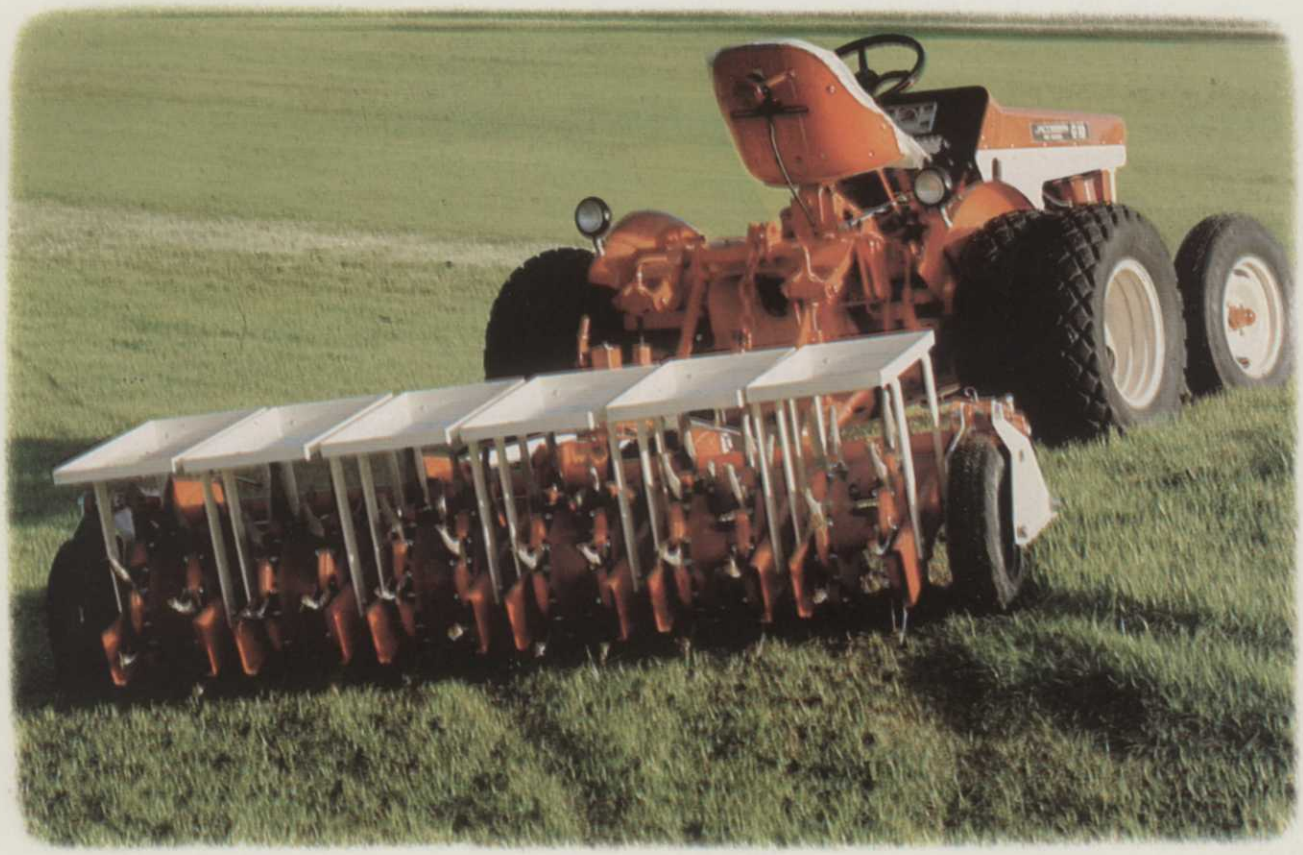
FRANCHISES AVAILABLE in Horticultural Pest Control, Tree Service and Weed Control. 25-year-old established company system to back up all franchises. Must have experience and or education in Horticultural field in southern California. Send resume to: Box 175, Weeds, Trees & Turf, P.O. Box 6951, Cleveland, Ohio 44101.

LEARN LANDSCAPING and the Growing of Plants at home. Start a satisfying business or hobby. Free booklet. Lifetime Career Schools, Dept. A-260, 2251 Barry Avenue, Los Angeles, Ca. 90064.

Some ground is level. Some is contoured. Only Jacobsen Aerators are designed to handle both.



The ability to aerate both in-line and contour turf surfaces with the same aerator is an exclusive Jacobsen feature. We designed it with the dual ability simply to match the way ground really is, rather than the way we wish it would be.

Closed coring tines, open coring tines, cultivating tines, slicing blade and spiking blade offer a variety of aerating methods.

Jacobsen's patented frame design makes even penetration of uneven ground possible. Because the aerator is built in sections, you can equip each section with an individual weight tray. This lets each section closely conform to the contours of uneven ground. Or, you can use full length trays for level ground.

Then, to aerate properly according to your specific ground conditions, you have a selection of tines and blades.

With these you can aerate, core, spike, slice, cultivate and renovate compacted earth.

These open the dirt to let air, sun, water and fertilizers soak deeper into the root system of turf that's getting choked by heavy or compacted soil.

There are two models you can pick from. The 590 aerates a seven foot swath, the 595 does a five foot swath. And both operate up to 10 mph.

Notice how each section rides close to uneven contours of ground to provide even aeration. Individual weight trays provide pressure.

For healthier and more luxuriant turf, you might take a close look at Jacobsen Aerators.

They're the only ones designed to work on ground that's either even or contoured.

Take a look at leadership.

Jacobsen Manufacturing Company, Racine, Wisconsin 53403

JACOBSEN®

An Allegheny Ludlum Industries Company

Circle 109 on free information card

"Broadmoor has a reputation of beauty and perfection. baron helps us to keep that reputation."

KENTUCKY BLUEGRASS

Chuck Clark, Director of Golf Courses, The BROADMOOR Colorado Springs, Colorado

"Baron's dark green color sets off our light colored greens and keeps its color late in the fall. I'm particularly pleased with the overwintering and drought tolerance of Baron. This requires less water, and in this part of the country, that's important."

"Laying sod is never an easy job, but Baron seems to make it easier. Baron's rhizomes form such a tight knit sod that it stays together like glue."

"We use Baron on all of our collars. Here we mow to ¾". Even with this close and constant cutting, Baron forms a dense turf with stiff upright blades that hold the ball up real well."

Chuck Clark explains to Peter Loft, "On steep slopes we use 100% Baron. One reason is it seeds out at a lower height giving me a lower growth pattern. This lowers maintenance cost too, due to reduced frequency of mowing."

"Because Baron proved itself on our new South Course*, we're using Baron in our overseeding program on our two other courses. Baron's proved itself at The BROADMOOR. We are currently using Baron for all 54 holes."

LOFTS

Lofts Pedigreed Seed, Inc.

Bound Brook, NJ 08805 / (201) 356-8700

Lofts/New England
Arlington, MA 02174
617-648-7550

Loft Kellogg Seed Co.
Milwaukee, WI 53201
414-276-0373

(Canadian Baron Dist.)

Great Western Seed Co.
Albany, OR 97321
503-926-2636

Lofts/New York
Albany, NY 12205
518-456-0042

Oseco Ltd.
Ontario, Canada
416-457-5080

*The South Course at The BROADMOOR was designed by Edwin B. Seay with Arnold Palmer as Consultant.

Circle 135 on free information card